

An inquiry into the seat and nature of fever : as deducible from the phenomena, causes, and consequences of the disease, the effects of remedies, and the appearances on dissection. / By Henry Clutterbuck.

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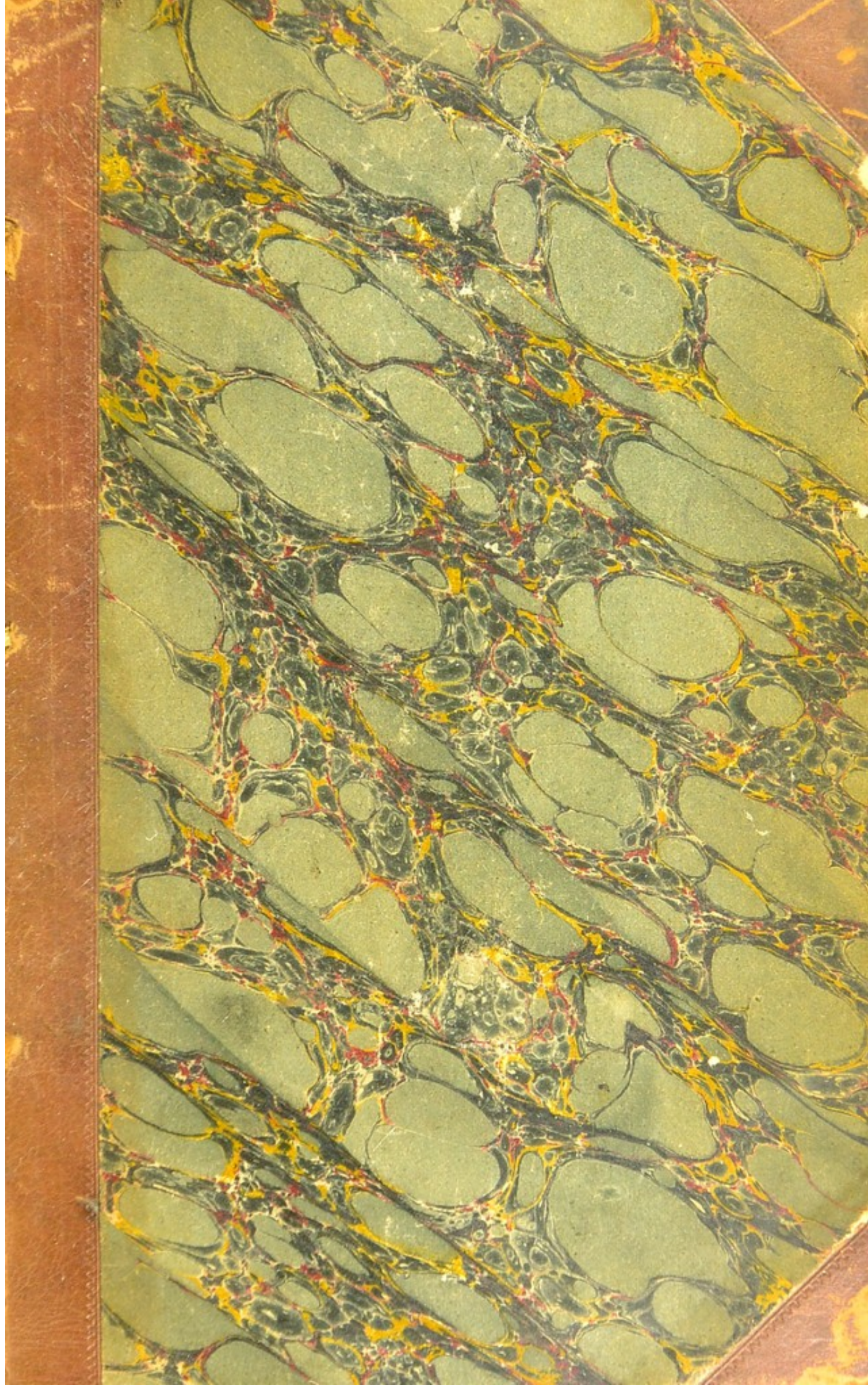
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THE SEAT AND NATURE
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OF
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THE REPORT

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FEVER;

AS DEDUCIBLE FROM THE PHENOMENA, CAUSES, AND
CONSEQUENCES OF THE DISEASE, THE EFFECTS OF
REMEDIES, AND THE APPEARANCES ON DISSECTION.

BY HENRY CLUTTERBUCK, M.D.

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON, SENIOR
PHYSICIAN TO THE GENERAL DISPENSARY, LECTURER ON THE
THEORY AND PRACTICE OF MEDICINE, &c. &c.

SECOND EDITION.

LONDON:

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PREFACE

TO THE SECOND EDITION.

NEARLY twenty years have now elapsed since the appearance of the former edition of this work ; and within this period there have been a considerable number of publications on the subject of fever, in which the opinions I have hazarded, have been variously commented on. By some, they have been altogether rejected as untenable ; while, by others, they have been partially adopted ; but, in few instances, have they been admitted to their full extent ; and the consequence is, that the ordinary treatment of the disease, though greatly improved by the more general adoption of the *antiphlogistic* plan of cure, is still, in many respects, vague and uncertain, from not resting upon a generally-admitted principle, such as I have endeavoured to lay down.

The striking affection of the brain in fever,

has been allowed on all hands ; for those who in more general terms, refer the disorder observed in the state of the *sensorial functions* to the *nervous system* altogether, use language that is hardly intelligible, unless in reference to the brain, which constitutes, as it were, the centre and chief part of the *nervous system*. But the view that has been taken of the actual condition of the brain in these cases, is widely different. Some have considered the brain in fever to be in a state of simple excitement, (or as it is called, *erethism*,) short of actual inflammation ; while others, on the contrary, consider the nervous energy to be depressed.

The connexion of fever with inflammation, and even its absolute dependence upon this state, has been maintained by many ; who, however, do not consider the brain as specially or exclusively the seat of the inflammation, nor indeed more frequently so than other organs. Others again imagine the disease to be wholly independent of inflammation, though it is admitted that topical inflammation frequently arises during its course, as an accidental circumstance ;

and lastly, there are many observant and experienced physicians, who still retain the notion of the *universality* of the disease; among whom I may particularly mention Dr. Hosack, of New York, who thus expresses himself on the subject:—"Fever," he says "is a disease of the whole system, mind and body; of all the organs, and all the functions; in the fluids, as well as solids; is omnipresent, and has no one pathognomonic symptom*:" and the learned Editor of the *Medico-Chirurgical Review*, for Jan. 1825, when commenting on Dr. Hosack's work, says, "the above is nearly the doctrine which we have maintained in this Journal, since its commencement; and the longer we live, the more we are convinced of the danger, as well as error, of the partial doctrines which have been so industriously inculcated of late years." A heavier charge, indeed, than this, is made against the new doctrines identifying fever with inflammation; "as having led to a system of *ultra-depletion*;" a charge, however, to which I think it is by no means justly liable. On the other

* *Essay on various Subjects of Medical Science.* N. Y., 1824.

hand, the Editors of the *Medical and Physical Journal*, for April, 1821, p. 336, treat the idea of fever being a universal disease, as absurd; "because," it is said, "such a supposition precludes all reasoning on the nature of such diseases; as it is impossible to draw any inference respecting their etiology."

Thus it appears, that although the doctrine I have supported has been impugned in various quarters, my opponents are not at all agreed in their own views of the subject. After the most attentive consideration of the various objections that have been brought against it, and after a tolerably extensive experience of many years, I still find no reason to abandon the general principle contended for; believing, as I do, that it is fully competent to explain all the essential phenomena of the disease, while, if true, it is calculated to have the most important and beneficial influence in regard to practice; fully impressed with this conviction, I have thought myself justified in again submitting my opinions to the consideration of my professional brethren.

It is by no means my intention to reply minutely to the various individual objections that have been brought forward. Such a discussion would carry me to an inconvenient length, and appears better adapted to a future occasion, when the varieties of fever come to be considered. Indeed if the arguments adduced in the present volume, fail to convince, I shall have little hope of succeeding by the most laboured reply. It will be sufficient at present to notice a few of the principal points.

To the objection urged by Dr. Beddoes* and others, that inflammation is as often, if not oftener, found in other organs, as in the brain, and therefore that they might equally be accused as the focus and origin of the disease with the brain itself,—I reply, that in every case of *idiopathic* fever, the affection of the brain, as consisting in inflammation, is manifest in the state of the symptoms; while inflammation in other organs, is an accidental, and only occasional, occurrence. Such cases, when they do occur, constitute *complicated* states of fever,

* *Researches on Fever.* By Dr. Beddoes, M.D.

in which the *secondary* inflammation is super-added, as it were, to that of the brain ; while, in *simple* fever, the brain-affection is the sole and essential part of the disease. Fever is thus often found combined with *pneumonia* ; and the state of oppression into which the brain gradually falls, in the course of the disease, is the natural consequence of the continued inflammatory action that is going on in the organ, and which reflects its influence upon the pulmonic inflammation, so as materially to alter its character ; occasioning those appearances of lowness and depression of general strength, muscular as well as vascular, which have given rise to the term *pneumonia typhodes* : and so of others.

Then, as to the affection of the brain in fever being a state of simple excitement, or *erethism* merely, and not actual inflammation, my argument to the contrary is, that the symptoms, both the *local* as respects the brain, and the *general* as respects the rest of the system, are all such as characterize inflammation in general, due allowance being made for the particular nature and functions of the part affected.

This mode of proving the existence of inflammation, namely by the examination of symptoms during life, is precisely that resorted to in all diseases ; and I know of none other that is applicable to the purpose. It is from the pain in the head, the throbbing of arteries, internal as well as external, the increased heat in the part, and the excited and disordered state of the *sensorial* functions, and of others peculiarly dependent upon, or influenced by, the brain, that the existence of inflammation in this organ is inferred ; and which is farther strongly confirmed by the state of the general system, which is precisely that occasioned by inflammation in general ; viz., *pyrexia*, or general febrile symptoms, such as heat of skin, foul tongue, and accelerated pulse, all of which signs are as common to *idiopathic* fever, as to other inflammations. Simple excitement of an organ, not amounting to actual inflammation, produces no such effects.—I should have added to the above, the appearance of the blood when drawn, which corresponds with that observed in inflammation.

Dr. Good, in his most learned and elaborate work, "*the Study of Medicine*," speaking of the alleged connexion of fever with inflammation, says, "it is to confound *fever* with local inflammation; the *idiopathic* with the *symptomatic* affection."—Vol. 7, p. 58. To this charge I must undoubtedly plead guilty; for my principal object is, to prove that there is no foundation for the use of the term *idiopathic fever*, if it be intended to express a state of fever independent of local inflammation; for I maintain that the *simplest* case of fever, as well as the most complicated—in short, every case of what is called *idiopathic fever*, is a mere effect of topical inflammation of the brain: the general disorder observed in the vascular system, producing the heat of skin, accelerated pulse, diminished secretions, and the like, (from which the very name of *fever* is in fact derived) being as truly *symptomatic*, as in any other form of inflammation; while the proper, or characteristic symptoms, which make the distinction between what is called *idiopathic* fever and other inflam-

mations, are all referable to the brain, and arise out of the disordered state of feelings and functions in this organ. Dr. Good further quotes the opinion of Professor Marcus, of Bavaria, who regards all inflamed organs, as equally causes of fever; and thus he makes inflammation of the brain to be the proximate cause of *typhus*; inflammation of the lungs, of *hectic-fever*; of the peritoneum, of *puerperal fever*; and so on.—But the answer to this is, that *simple* inflammation of the lungs produces only common febrile symptoms; and the same is the case with regard to inflammation of the peritoneum; but where these affections arise in conjunction with real *idiopathic* fever, then it is that they assume what is called the *typhoid* character: that is, disorder of the *sensorium* is superadded to that of the individual organ before affected. Such are merely cases of *complicated fever*, in which the inflammation of the brain may be either *primary* or *secondary*, each appearing occasionally to give rise to the other. Dr. Good concludes with observing, “that if a single example of fever terminating fatally, with-

out leaving behind it a trace of inflammation in any organ whatever, could be found, it would be sufficient to establish the existence of fever as an *idiopathic* malady, and to separate the febrile from the phlogistic division of diseases.” —p. 60. I fully admit with him, that such examples do frequently occur; without, however, adopting his conclusion; for sufficient proof has been afforded, that dissection is not always capable of shewing the previous existence of inflammation in any part; inflammation consisting essentially in disordered action only; of which disordered action, change of structure is indeed a frequent, but by no means a necessary consequence.

That idiopathic fever also, consists in disordered action merely, and not in change of structure, is clearly evinced by the speedy and almost abrupt termination of the disease in some cases; where, within the short space of four and twenty hours, the *sensorial functions* are all restored from a state of the greatest disorder, and almost total obliteration, to a natural but greatly weakened state; the general disorder of

system, (the *pyrexia*) as being merely *symptomatic*, and therefore dependent upon the topical disease, subsiding at the same time. This could not possibly happen, if any alteration of structure had taken place; for this being the consequence of a change in the growth of the part, must be at least as slow in receding as it was in forming. Here, it is evident, fever has its exact counterpart in inflammation.

Dr. Mills, of Dublin, in his *Comparative View of Fever and Inflammatory Complaints*, 1824, adopts the notion of Marcus, alluded to, but puts in a claim to originality on this score; and he recites his general conclusions as if they were of his own discovery—1st, that fever is inflammation; 2nd, that fever is of one kind, of which there are many varieties; and 3rd, that the varieties depend on the organ or part particularly affected. Like Broussais, a French writer, he makes his division of fever accordingly, into the *cephalic*, *gastric*, *hepatic*, &c. This is evidently nothing more than the doctrine of Marcus, above quoted. Dr Mills, also, in his pamphlet on the utility of blood-letting

in fever, says, "may I not say I have reason to congratulate myself then, on a change, to the producing of which I have been in some degree instrumental?"—With regard to this point I may merely state, that Dr. Mills paid me the unexpected compliment of dedicating to me his first publication on the subject of fever, acknowledging, at the same time, his obligations for the view of the nature of fever I had given, and the improvement in practice to which it led. In his last work, however, no notice is taken of this, though he cites very particularly a number of authors who have written on the subject since that time.

In regard to the objection drawn from the want of appearances after death, as necessary to the confirmation of the doctrine, I repeat, that the objection is by no means conclusive, for reasons that have been fully stated in the body of the work. I may, however, observe further here, that the greatest contradiction exists amongst writers, even the most recent, with respect to the evidence deducible from dissection; thus, Dr. Edward Percival, of Dub-

lin, in his *Practical Observations on Typhus Fever*, 1819. p. 83, observes, "I have superintended numerous dissections of patients who have died of the *typhus* fever. In *typhus gravior*, attended with low muttering delirium and *coma*, the brain usually exhibited evidence both of *venous* and *arterious* congestion. These were not less observed in cases that had run a short course, than in those which were more protracted. On removing the upper part of the *cranium*, blood was frequently found effused; the vessels of the *pia mater*, and *plexus chorooides*, were often tinged; and portions of the serous membrane, opaque. A glary fluid, sometimes tinged with blood, was interposed between this membrane and the arachnoid tunic; more or less of limpid fluid was found in the ventricles. On dividing the substance of the brain, numerous bloody points usually presented themselves on the surface of the separated parts."—"In *typhus mitior*," he says, "the morbid appearances, on dissection, so strongly resembled those which have been already recited, under the head of *typhus gravior*, that it

would be superfluous to repeat them." Notwithstanding the above are mentioned by Dr. Percival as usual appearances, he adds subsequently, "I have examined many cases, in which no deviation occurred from the due or ordinary condition of that organ." Dr. Percival speaks of arterious congestion; but the arteries are principally to be seen at the basis of the brain, and must, almost of necessity, be torn in removing the brain from the basis of the skull in the ordinary way, by which they must be emptied of their blood, supposing them to retain any after death, which is not very probable. Dr. Cheyne, again, in his *Report of the Hardwicke Fever Hospital*, in the same City, for 1818*, says, "I do not recollect a single dissection in which the remains of an excited state of the vessels of the brain did not appear; in which the surface of the brain was not in an *inflamed*, or rather *sub-inflamed* state; as was demonstrable, either from the state of the minute arteries, or from consequent effusions." On the other hand, Dr. Macartney, Mr. Kirby,

* *Dublin Hospital Reports* Vol. 2, Page 67.

and others, observed no such appearances, nor any thing that, in their opinion, indicated the existence of inflammation in the brain. It is needless, however, to notice further these contradictions; for it is admitted by those best qualified to judge of the subject, that dissection is not competent to determine the question, since inflammation, either of the brain or of other parts, does not necessarily, and in all cases, leave behind it visible traces of its existence. Morgagni, as well as others, whose accuracy of observation and due qualifications cannot be doubted, have stated that they have seen instances of patients dying of phrenitis, of pleurisy, and other inflammations, without the body after death presenting the slightest sign of lesion of the brain or the *pleura*. The insufficiency of dissection, on many occasions, to shew the seat, or existence even, of disease, is strongly pointed out by Bichat, in his General Anatomy. "A serous membrane," he observes, "may have been considerably inflamed during life, and yet present nearly a natural appearance after death.—I should frequently," he adds, "on

dissection, have been induced to pronounce the non-existence of an affection, which had actually taken place." "This principle," he afterwards remarks, "admits of being applied to a variety of diseases, and is of the utmost importance in dissection." He acknowledges, that the neglect of it at one time, frequently led him into error in respect to the intensity, and even the existence, of acute inflammation: (p.p. 570, 571, Vol. 1. Eng. Trans.) Similar observations have been so frequently made by others, that it is needless to repeat them. They prove unequivocally, that *dissection* is by no means an unexceptionable guide, while the evidence afforded by *symptoms*, may be relied upon; moreover, it is not to be presumed, that the appearances after death, are a true representation of the living state; for reasons that are too obvious to be mentioned.

It is a great mistake to suppose that the morbid appearances observed in the brain after death, are, in general, the cause of the symptoms that take place during life. They are commonly to be considered as affording evidence

only of the existence of disease in the part. This is clear, when we refer to the case of *epilepsy*, *mania*, or other periodical affections of this organ: where alterations of cerebral structure are frequently found, which, having once taken place, must, of necessity, be permanent, although the symptoms are of occasional occurrence only. And the same conclusion may be drawn, from the great similarity observed in the morbid appearances, after different diseases of the brain; so that, in fact, it would puzzle, I believe, the best anatomist, to indicate, from *post-mortem* appearances merely, the disease under which the patient had laboured; or, on the other hand, to predict, with any tolerable certainty and precision, what the appearances would be after death, from any given set of symptoms manifested during life. The essence of disease, in short, as has been before observed, consists in something far more subtle and fleeting, than the gross changes that are to be detected by the knife of the anatomist.

Dr. Good appears well aware of the insufficiency of morbid anatomy to illustrate the essen-

tial nature of disease on a variety of occasions, as will be evident from the following quotation:

“However valuable an expert practice in dissection may be to a student in the field of anatomy, in a pathological point of view, its developments, except where strictly applicable and illustrative, will more frequently perplex than instruct him. They will rarely give him any information concerning the elementary or chemical changes that have taken place in the animal fluids; and may lead him, in a thousand instances, to mistake effects for causes, the result of symptoms or accidents for that of idio-pathy, even in morbid changes of structure. The truth is, as M. Foderé has justly observed, that by far the greater number of diseases are the products of disordered vitality, before they become organic; and when at length they assume such a character, it is as a consequence rather than as a first moving power. On which account this distinguished pathologist is disposed to place but little reliance on the scalpel. —*Pref. 2d Edit.*

It is highly gratifying to me, to observe,

that although the *theory* for which I have contended, has been called in question, most of those who have impugned the general principle, admit, nevertheless, the propriety of the *antiphlogistic* treatment, including *blood-letting*, especially at the outset of the disease, which is the point I principally contend for. Indeed, a great revolution has taken place, in this respect, within the last few years, in the practice of this metropolis, and I believe, of the country in general; and it cannot be denied that such is the natural result of the doctrine I have presumed to maintain; indeed I know not how to explain the salutary effect of *blood-letting* in the cure of fever, now so generally admitted, without referring to the supposed inflammatory nature of the disease. In a word, the treatment of fever that is most decidedly and unequivocally useful, is that of inflammation in general, due allowance being made for the peculiar nature and circumstances of the organ affected.

I am sorry to have occasion to notice one striking exception to what is observed above, I mean that of Dr. Wilson Philip, who has

treated the subject of fever at great length, and whose authority will be felt to have much weight. In a paper, published in the *Medical and Surgical Journal*, for Jan. 1808, alluding to the present work, he says "the fatal effects of the practice to which it leads, are now, after a full trial of the county where I live, generally admitted;"—and he refers to his practice at Worcester, in proof of the bad effects of *blood-letting*. "In the few instances," he adds, "in which I have seen *blood-letting* employed, it seemed to do much mischief; the strength sunk rapidly, and the worst symptoms of *typhus* soon shewed themselves;" and he alludes to the neighbouring practitioners, as all concurring in declaring it to be decidedly hurtful. "The most favourable account," he says, "has been, that the patient was saved with difficulty, after *blood-letting*; but several have assured me, that all the cases in which they had seen it employed, although it had been confined to the commencement of the disease, terminated fatally. Now, indeed, the opinion against it is so general and decided, that we never have an opportunity of seeing its effects

in these fevers, except where the patient has been under the care of a practitioner *unaccustomed* to treat the fevers which prevail here."

I cannot but think, that the statement given above, contains within it, its own refutation; for the great reluctance felt to the use of *blood-letting*, must have precluded Dr. Wilson Philip and his correspondents, from witnessing the effects of the practice, and so far tends to invalidate their testimony against it. At all events I may oppose to this statement, the experience of a vast number of other practitioners, as well as the practice of the *General Dispensary*, where the good effects of *blood-letting* in the cure of fever, upon a large scale, are almost daily witnessed. I may add likewise, the more weighty authority of Dr. Bateman and Dr. Armstrong, physicians to the Fever Hospital, both of whom have expressed themselves favourable to the practice, under the circumstances in which I have ventured to recommend it.

Among other objections that have been offered, the originality of the principle has been called in question; and from the citations of

Dr. Beddoes, it is evident, that about the period of the first publication of the present "Inquiry," and even some time previously, opinions of a similar nature were entertained by some practitioners and teachers on the continent. Against a charge of plagiarism, thus insinuated, I can offer nothing but a simple denial; the *truth* of the doctrine, however, is the only point that is likely to interest the medical public; and I shall feel well satisfied, to find myself supported by such authorities, even were they proved to be prior in point of time to my own.

PREFACE

TO THE FIRST EDITION.

To a person unacquainted with the History of Physic and the imperfect state of its doctrines, it must occasion no small surprise to find, that a disease of almost daily and universal occurrence, and which has employed the pens of the most enlightened of the profession, for the space of 2000 years, should at the present day be involved in doubt and obscurity; and that the widest differences of opinion should still subsist, both with regard to its nature and the mode of treatment.

That such is really the case, however, will be readily admitted by every one the most slightly versed in medical science. Physicians neither agree among themselves as to what fever is, or in what it essentially consists; nor have they assigned to it any certain and determinate seat. One of the ablest writers on the subject of fever

remarks, in almost his opening paragraph, that "what the real derangement in the system is, which produces the external appearances in fever, is not at all known: it is a disease," he says, "the essence of which is not understood*."

The little success that has attended all the speculations which have been hitherto made with regard to the nature of fever, appears, undoubtedly, well calculated to discourage further attempts of the same kind, and to induce a belief that the obscurity of the subject is inherent in, and inseparable from, it.

Such a hopeless view of the matter, however, would lead to practical evil; for it cannot be denied that the practice of physic has, in many instances, been materially benefited by hypotheses, which have ultimately turned out to be unfounded. New instruments of cure have been often thus suggested, and the powers and uses of others more amply investigated. It may be fairly questioned, whether the powers of opium, wine, and many other of the most ac-

* *Dissertation on Fever.* By G. Fordyce, M.D. F.R.S. Part.1.

tive articles of the *Materia Medica*, would have been so well understood as they are at present, but for the temporary prevalence of particular hypotheses.

I have not been deterred, therefore, by the ill success of former inquiries, from entering the field of speculation on so important a subject; believing, as I do, that the difficulties which lie in the way, will be sooner or later surmounted, and that the most beneficial consequences, in regard to practice, will be the result of a successful investigation of it; and that, even in case of failure, collateral advantage may accrue.

The doctrine which I have brought forward, is, to the best of my judgment, a fair and legitimate deduction from generally-admitted facts; for the truth of which, I have appealed to the history of the disease, as delivered down to us by the most accredited writers and practitioners of all ages. It is strongly supported also by analogy, and is in unison, if I mistake not, with the general laws of the animal œconomy.

I have endeavoured, as far as possible, to adhere to the rules of investigation laid down

by Sauvages, in the preface to his great and valuable work on Methodical Nosology:—
“non ex causis nec ex sede morborum, ad eorum symptomata, sed ex symptomatis ad sedem causasque morborum est procedendum, tutoque progredi potest medicus.”

For further confirmation of the doctrine, I have referred not only to the symptoms and consequences of the disease, as they take place in the living body, but to the appearances discoverable after death, as reported by the best observers.

The advantages to the medical practitioner of a just theory of diseases, will scarcely be denied. Experience is a sure and safe guide, as far as it goes; but it is too often lame and defective. It is impossible to foresee and provide adequately for the infinite diversity of changes that take place in living bodies, without the aid of analogy and induction; the practice of physic without these, must ever be incompetent to meet the continually-varying circumstances of disease.

When we reflect on the remedies that have

been recommended and employed in the cure of fever, we cannot but be struck with their number and variety. Every age, and almost every practitioner, indeed, possessed of sufficient courage to think and act for himself, has had his favourite remedies, which have been relied upon as if they were exclusively adapted to the purpose; while the practice of others has been considered as worse than useless.

The choice, in this case, has lain not merely between remedies of the same general character and operation, but between those of the most opposite descriptions. Blood-letting, emetics, purgatives, sudorifics, mercury, blistering, cordials, refrigerants, acids and alkalies, heat and cold, have all been favourites in their turn, as if each were alone deserving of confidence.

This contradiction exists, or has existed, with regard to almost every active remedy employed in the cure of fever, and occasions the greatest embarrassment to the young and inexperienced practitioner. The want of a leading principle, to guide him in his choice of means, has been strongly felt and acknowledged; and

it can only be supplied, as it appears to me, by the establishment of some consistent theory of fever, capable of explaining at once the phenomena of the disease, and the effects of remedies. While fever continues to be looked upon in the light of a general affection, or disease of the whole system, without any primary and determinate seat in the body, we can never hope to discover any thing certain with regard to its intimate nature; nor to be able to lay down any precise rules for its cure.

How far the present doctrine is calculated to lessen, or remove, the difficulties above complained of, it is not for me to determine. It is, perhaps, a presumptive argument in its favour, that it is not opposed by experience; but at once explains, and is supported by, the effects of the best established modes of cure.

It will be readily admitted, that the task I have undertaken, of endeavouring to explain the intimate nature of fever, is one of no small difficulty or extent; which will serve, I may hope, to palliate the imperfect execution of it.

The doctrine here contended for, namely, that fever consists essentially in topical inflammation of the brain, would seem, at first view, to indicate the necessity of *blood-letting* to a great extent, as a general means of cure. An indiscriminate practice of this kind, however, is no just or necessary inference from the doctrine, as I trust will be satisfactorily shewn. Yet the keeping constantly in our view the existence of a morbid and excited vascular action in the brain, may be productive of advantage in various respects; but more especially with regard to the use of heating and intoxicating medicines, as spices, wine, opium, and the like, which are too often, in modern practice, carried to a dangerous length.

The most observant physicians at present in this metropolis, and I believe also in other parts, are becoming daily more and more convinced of the impropriety of an indiscriminate use of remedies of this description, in the treatment of fever, even of the lowest kind. Yet there are still too many practitioners who administer to their patients, with an unsparing hand, wine, and even alcohol; with other things

of the same general nature; with little regard to time or other important circumstances.

Debility seems to be their only dread; and to counteract this (which is an *effect* only, and not the essential part of the disease,) they resort to the use of means that are calculated to increase the *cause*. In this way, they not only fail to accomplish their purpose, but too often sacrifice the patient in the attempt.—If the only effect of the doctrine here inculcated were that of inducing a greater degree of caution in the use of remedies of this sort, I should think I had rendered no small service to society.

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AN INQUIRY, &c.

SECT. I.

GENERAL OBSERVATIONS.

AS health consists in the perfect performance of all the functions, so every deviation from this may be called disease: in other words, disease is an imperfect or irregular performance of the functions of the whole, or any part, of the system.

All the morbid changes which take place in the living body, may be referred ultimately to a change in the mode of *acting* of some of its parts. The changes in *sensation* which so commonly occur in diseases, as pain, torpor, or perverted feeling, can, in most cases, be easily traced to a previous change of *action*, either in

the part itself in which the disordered sensation exists, or in one that is connected with it by nervous communication.

The *vascular* system, including blood-vessels and absorbents, is the principal agent by which all the great changes, natural as well as morbid, that take place in the living body, are brought about. It is at once the instrument of supply and of waste to the body, and of energy to the mind. Its regular actions are the source of life and health; its *disordered actions* the occasion of disease and death, in a great majority of cases. There are few diseases, indeed, which may not be traced to the vascular system, as their seat. *Inflammation*, a disorder of this system chiefly, is the immediate cause of nine in ten of the great and fatal maladies which afflict mankind, and the indirect source of most others. Most of the *spasmodic, convulsive, and painful* affections, ranked by nosologists among *primary* diseases, are, in fact, nothing more than *secondary* or remote effects of disordered vascular action in the brain, or other parts of the nervous system. The greater number of *mental* affec-

tions are also clearly referable to the same source.

Scarcely any part of an animal is purely *passive*. The nerves and their coats are furnished with blood-vessels, which are probably endowed with muscular power; every exertion of which, must produce a corresponding change in the condition of the nerves themselves, and consequently influence, more or less, their sensibility. In like manner, the brain, though in itself incapable of motion, is abundantly supplied with moving parts, namely, the blood-vessels; the varying action of which, manifestly affects both the condition of that organ, and the sensibility and mode of acting of the rest of the system.

A disease may consist merely in *disordered action*, occasioning either altered feelings, or disturbance of functions, or both; without any perceptible *alteration of structure* in the part affected. In such cases, dissection after death can afford us no insight into either the *seat* or *nature* of the disease. Thus we might feel convinced, by the pain felt in the region of the

heart, and the stoppage of the circulation, that the heart was in a state of *spasmodic* contraction, which, if it continued but for a very few minutes, must of necessity prove fatal; yet no trace of such disease would be discovered after death; because all spasmodic contraction would then have ceased. In like manner, *inflammation* is *primarily* and essentially a state of *disordered action* merely, though leading eventually to *alteration* of *structure*, not so much according to its degree as to its duration; and if, either by its violence or by interrupting the functions of a part that is essential to life, the inflammation prove quickly fatal, it may still leave no visible traces behind it; for it may not have subsisted long enough, to have produced such an effect.

Changes, likewise, take place at the time of death, and subsequently, which materially affect the appearances on dissection; so as to convey a false idea of what really existed during life. The contraction of capillaries, by repelling the blood back into the larger trunks, often renders the parts colourless, which were highly reddened during life; as has been noticed in re-

gard to *ophthalmia*, and many other cases. On the other hand, transudation taking place after death is a frequent cause of redness, which has been erroneously ascribed to inflammation.

Dissection, for the most part, shews the *consequences* only of diseased action, and gives but little insight into the *nature* of the action upon which those consequences depend. It serves occasionally to detect the *seats* of diseases; though when diseases consist, as they often do, merely in irregular action, without any change of structure, or at least any that is discoverable by the senses, as may be the case, dissection is not competent even to this: Further, the appearances discovered after death are not always the cause of the symptoms that took place during life; as in cases of *epilepsy* (as well as many others), where the morbid state of parts can be considered, at most, but in the light of a *predisposing* cause; the paroxysm itself being explicable only on the supposition of temporary or occasional disordered vascular action of the brain.

Morbid anatomy, therefore, is of limited use

and application in the practice of medicine. Diseases must be judged of, and their treatment regulated, chiefly by the signs or symptoms that present themselves during life; and not by presumed changes, that may or may not have taken place, in the organization of the body, the knowledge of which, in general, comes too late for any practical purpose*.

Diseased actions are not always accompanied with *sensation*; hence diseases of parts that lie concealed from view are liable to be overlooked. The lungs, the brain, and many other

* The insufficiency of dissection, on many occasions, to shew the seat or existence even of diseases, is strongly pointed out by *Bichât*, in his *General Anatomy*. "A serous membrane," he observes, "may have been considerably inflamed during life, and yet present nearly a natural appearance after death; and it is just the same in erysipelas. I should frequently," he adds, "on dissection have been induced to pronounce the non-existence of an affection, which had actually taken place. The same remark is applicable to the cellular tissue and mucous surfaces, affected with inflammation." This principle, he afterwards remarks, admits of being applied to a variety of diseases, and is of the utmost importance in dissection. He acknowledges, that the neglect of them, at one time, frequently led him into error, in respect to the intensity, and even the existence of acute inflammation. pp. 570-71, Vol. 1. English Translation.

parts, have been found disorganized after death, where no pain or other obvious affection of those organs occurred during life, that led to suspect the existence of such injury.

But although diseases cannot, in all cases, be detected by the feelings of the organ itself, they are sometimes discoverable by the affection of other parts that are in connexion with it. Thus we are enabled to trace many affections of the stomach, of the vascular system, and of other remote parts, to a disordered state of the brain. And so in many other instances.

No part can undergo any material alteration in its mode of acting, without a corresponding change taking place in its functions. If it be a *secretory* organ that is affected, the *secretion* will be changed in quantity or quality, and commonly in both respects at once: if it be an *organ of sense*, its *sensibility* will be augmented or impaired, or otherwise perverted. If the *brain* (the common source of *sensation*, *voluntary motion*, and *mental energy*,) be the part affected, all these functions will suffer, in proportion to the extent and degree of topical dis-

ease. An attention, therefore, to the manner in which the different functions are carried on, is indispensable in the investigation of diseases, and generally affords a clue to the discovery of their particular seats in the body.

Diseases, as we commonly observe them, are by no means simple phenomena ; but consist of an assemblage of various symptoms, that differ widely in their nature, and in the order of their occurrence.

Some are *proper*, or peculiar to the disease in which they take place, and serve to distinguish it from other diseases, the *pathognomonic* symptoms, as they are termed; others are *common*, or such as may take place in different diseases. These have no necessary relation to the part *primarily* affected, but may be produced indifferently by the affection of different parts. Thus, when any organ is attacked by inflammation, the pain felt in the part, and the disturbance observed in its functions, are the *proper* symptoms of the disease ; while quickness of pulse, and a feverish state of body, constitute the *common* symptoms only, as they are

observed to occur indifferently in the inflammation of various parts. The *common* symptoms are generally *secondary* in the order of their occurrence.

These distinctions it is highly necessary to keep in view, in all investigations into the *seats* of diseases; for the secondary or common symptoms have, in innumerable instances, been considered as the principal affection, and been treated accordingly: and in none has this happened more frequently, than in the disease which makes the subject of the present Essay; as will be shewn hereafter.

The obvious phenomena of diseases, or their most prominent external characters, are oftentimes *secondary* or *common symptoms* only; and when this is the case, they contribute little or nothing, *of themselves*, towards pointing out either the seat of the disease, or the proper method of cure. Thus, in *jaundice*, no one from merely observing the yellowness of the skin, eyes, and urine, could tell whether the obstruction to the passage of the bile into the intestine, and its consequent absorption, were

occasioned by inflammation of the liver itself, by tumour of a neighbouring part, by concretion of bile, or by spasmodic contraction merely; nor, of course, could he lay down a rational plan of cure.

In like manner, *pyrexia*, or general febrile symptoms, serve only to prove the existence of inflammation somewhere in the system; the real seat of disease must be determined by an inquiry into the feelings of the patient, and into the state of the different functions.

The *secondary* or *common* symptoms of a disease are not only at times the most striking, but frequently the occasion also of the chief part of the distress which the patient suffers, and on this account, undoubtedly, require considerable attention in practice: still, it is of importance to trace the dependence of symptoms on one another, and to distinguish between such as are *primary*, and such as are *secondary* only; for, by removing the former, the latter generally disappear of themselves, or are easily removed afterwards; whereas the removal of the *secondary* effects of diseases not only does

not necessarily remove the *primary*, but the attempt to effect it is sometimes detrimental. Thus in peripneumony of the most violent kind, and in inflammation of the stomach or small intestines, if we were to attend only to the feeble state of the pulse, and the general prostration of strength, which are so remarkable in these affections, we should be tempted to employ remedies that excite the powers of the system to greater exertion ; but by so doing, it is manifest we should in general aggravate the original disease.

It is not uncommon for the names of diseases, and often the indications of cure, to be taken from their *secondary* symptoms, without regard to the nature of the primary disease ; whence much bad practice has resulted. This will be shewn particularly to have been the case in fever ; and it may be instanced, likewise, with regard to *stomach* complaints, as want of appetite and indigestion, which accompany a great number of diseases of different characters, and that require different treatment ; yet the use of stimulating remedies, under the

title of *tonics* and *stomachics*, is almost indiscriminate in such cases.

The great advantage to be derived from an acquaintance with the *primary* seats of diseases, is our being thereby enabled to administer remedies that are more especially adapted to the particular organ affected, and to make our applications more nearly or directly to the seat of mischief. This knowledge, likewise, tends to prevent the use of superfluous, and sometimes of injurious, remedies—the natural consequence of busying ourselves about *symptoms* merely, the removal of which has either no influence on the original disease, or is only to be accomplished by means that are detrimental to it.

A division of diseases has usually been made into *general* and *local*; that is, those where either the whole system, or at least a considerable number of parts, are disordered from the beginning by the immediate agency, as is supposed, of the exciting cause; and those where an individual organ only suffers at first, though subsequently, by sympathy, the dis-

order may become general. With the former class, *idiopathic* fever has almost always been ranked. The only reason, however, as it appears to me, for making such a distinction in regard to fever, is the more early and general disturbance that takes place in this, in comparison with other diseases. If, indeed, such general disturbance could not be accounted for upon what might be termed *local* principles, the distinction, of course, must be admitted. But I am far from thinking that such is the case.

It depends upon the simplicity of structure, and of function, in any organ, as well as the number and importance of its connexions in the general economy, in what degree and to what extent it will be likely, when diseased, to affect the rest of the system.

This may be illustrated by reference to *membranous*, as compared with *parenchymatous* inflammation. In simple pleurisy the symptoms are few, and consist in little more than pain in the part affected, with an excited state of general vascular action. In peripneumony,

or inflammation of the lungs themselves, a much more extensive disorder takes place in the system, from the great importance of respiration in the general economy. In this point of view, no organ will bear comparison with the brain, which exerts a paramount influence over all.

Hence, it is to be expected, that when the general substance of the brain is suffering from disease, the whole system will be drawn into consent, and a general disturbance of functions ensue. There is therefore no difficulty *à priori* in referring the extensive, or almost universal, disorder of functions observed in fever, to a primary topical affection of the brain, as its cause; and if the question be to be decided by actual observation, there will be found sufficient reason to support this opinion. A considerable number of individual cases of fever make their approach in so gradual a way, as to make it easy to distinguish between the primary *local* affection of the brain, and the subsequent *general* disorder of system; as much so, indeed, as in any ordinary case of inflammation. In the

fevers of temperate climates, this is often seen to be the case. The patient first complains of headache, which is aggravated by every exertion either of body or mind; he is languid, depressed in spirits, dull, and inactive; sleeping little, or in a disturbed way. These symptoms continue often for several days before the constitutional disorder arises, or before the fever is fully formed. In many of these cases, the primary local affection of the brain subsides again, without any general disorder supervening; especially if the patient be attentively and actively treated. Such instances do not, in strictness, merit the name of fever. In common language, they are often termed *feverish colds*, or *sick headaches*. Dr. Rush called them "walking cases of fever;" and such were not uncommon in the fatal endemic of Philadelphia.

And if, in some cases of fever, the general disorder of system follows so close on the heels of the primary topical affection of the brain, as to be with difficulty distinguished from it, and even to seem to take precedence of it, the same may be observed to occur in various other

topical inflammations, that make their attack with violence.

Dr. Cullen, describing the attack of pneumonia, observes :—"sometimes the pyrexia (febrile state) is from the beginning accompanied with the other symptoms ; but frequently it is formed for some hours *before* the other symptoms become considerable, and particularly before the *pain* is felt."—(c. vii. § 336.)

There is, however, in this case, more than one source of fallacy.

The attack of inflammation is not always denoted by *pain*, especially in parts that possess but little natural sensibility ; and in such cases, the general disorder may be the first to attract notice, although, in reality, it be secondary in the order of occurrence. Neglect or oversight of the first symptoms of fever, as well as other diseases, is far from uncommon ; yet upon such inattention the question of *locality* may often turn. Again, inflammation may arise in the lungs, or other part, in the early stage of idiopathic fever, and the fever go off in consequence, leaving the secondary affection behind,

to run its course. Such a case, it is plain, would not decide the point, so as to shew that the *general* affection may precede the *local* one, in cases of topical inflammation; as there would, in this case, be merely a conversion, or rather succession, of diseases, that have no necessary connexion with one another.

When it is considered, that every part of the body is endowed with a peculiar kind of feeling or susceptibility, rendering it liable to be affected by certain agents more particularly, that have often but little effect upon others; that the *exciting* causes of disease all act differently one from another, so as to vary the effect; and lastly, that an excess of action in one part is usually attended with an opposite mode of acting in others; we might on these grounds alone, reasonably expect, that diseases would, in general, be partial or *local* at their commencement; a conclusion that will be confirmed by attentive examination of diseases in general, and of *idiopathic* fever as well as others.

The considering the *secondary* effects of disease, as the disease itself, leads to a trifling

and inefficient practice, that consists in endeavouring to relieve symptoms, rather than the actual disease; a mode of treatment that is seldom more than palliative, and which is sometimes positively injurious. This is well exemplified in the use of *opium*, *wine*, and other *stimulants*, so often employed in the course of fever, for the purpose of procuring sleep, and *supporting the strength*, or *vis vitæ*, as is said, but with the real effect, in many instances, of aggravating the topical affection of the brain.

CHAP. I.

OF THE PRIMARY SEAT OF FEVER.

THERE is no disease that excites such general disturbance in the system, or deranges so many of its functions, as fever strictly so called: hence its symptoms are numerous and involved, and not easily reducible to any certain or constant order. It is not to be wondered at, therefore, that it should have been considered in the light of a *universal* disease, that is, as affecting at once, though unequally, great part of the body, but no one more particularly, or exclusively, than the rest. This opinion of the nature of fever has been entertained in all ages, with very few exceptions. It has been insisted upon by the latest and best writers on the subject; and is inculcated by the most eminent teachers of the present day. But it will be found upon attentive examination, that how-

ever numerous and diversified the symptoms may be, few of them are *essential*, or belong to it exclusively; while, with respect to the greater number, they are either *secondary* symptoms only, and such as are *common* to it with other diseases; or else they are *casual* and of uncertain occurrence; many of them being altogether the effect of adventitious circumstances, such as *climate*, *season*, *treatment*, or the particular state or habit of body of the patient.

In endeavouring to assign the *primary* seat of fever, it will be necessary to examine the various phenomena of the disease, to trace the *order* of their occurrence, and their dependance on one another, and on the *exciting* causes. We shall thus, if I mistake not, be led to the *brain* as the true seat of morbid affection in fever, and as the source of all the symptoms which essentially belong to it, and which serve to distinguish it from other diseases. This opinion will be confirmed by the consideration of the *remote* causes of the disease, and of the particular circumstances which seem

to predispose to it, as well as of the consequences which it often leaves behind.

By the term *fever* is here to be understood, that which has been strictly so called, the *idiopathic* fever of authors; excluding, for the present, that general febrile state of system which accompanies the topical inflammation of various parts, and which is known by the name of *Pyrexia*, or *symptomatic* fever. This is allowed on all hands to be a secondary affection, and will be further considered hereafter.

I shall only at present remark upon this point, that the general febrile symptoms, namely the increased heat, the accelerated pulse, and the furred tongue, are as truly *symptomatic*, or secondary, as they occur in proper or *idiopathic* fever, as in any ordinary case of inflammation. The essential, or *pathognomonic* characters of the disease are of a very different description, and to be found only in a disordered state of the *Sensorial Functions*.

It is necessary further to observe, that the description now to be given, with the observations that follow, are intended to apply particu-

larly to the *simple*, uncombined, form of the disease, such as it ordinarily appears in this and other temperate climates. Under this denomination of *Simple Fever*, I include all the gradations of the disease, from the slightest *ephemera*, to the most malignant *jail* or *Hospital* fever, as well as the varieties to which the terms *inflammatory*, *low-nervous*, and *putrid*, or the corresponding though less expressive technical ones *synocha*, *typhus*, and *synochus*, have been given. The *complications* to which fever is liable, have been the cause of most of the misconceptions that have been entertained on the subject; as will hereafter be seen *.

* In this use of the term *simple fever*, it is scarcely necessary to observe, that I differ *toto cælo* from late writers on the subject, who have defined it, as that "in which no organ is particularly deranged *,"— or, "in which there are no marks of decided topical inflammation †". I call that *simple fever* in which no organ, *except the brain*, exhibits signs of inflammation.

* *Bateman*. Succinct account of the contagious fever, &c. 1818.

† *Armstrong*. 'Illustrations of typhus.' page 9.

SECT. I.

OF THE PHENOMENA OF FEVER GENERALLY.

IN every case of *proper* or *idiopathic** fever, many of the most important functions of the body are observed to be disturbed. This disturbance, however, is not uniform in every part, but different in kind in different organs, and in the same organ at different times. Thus, the actions which are destined to support and nourish the body in health, (the digestive and assimilatory functions,) nearly cease altogether; while, on the other hand, the absorbents in general, and the excretory vessels on the surface, appear to act with increased energy, during a great part of the disease: and from both these causes it is, that towards the end of fevers of any long duration, the body is found in a state of extreme emaciation. Other functions are

* I use these terms merely in compliance with general custom, and to avoid being misunderstood.

often carried on in fever, with little change. Thus, in many instances, the general vascular system, the kidneys, the liver, and the intestinal canal, continue to perform their ordinary functions, nearly as in health: at other times, one or more of them are greatly disordered.

But although the phenomena of fever appear at first view so various and complicated, as scarcely to admit of arrangement, they will be found, when attentively examined, to observe a certain and determinate series and order, a careful attention to which will enable us, I apprehend, to assign the true and original seat of morbid affection. It is the want of a sufficient discrimination between the *primary* and *essential* symptoms, and those which are *secondary* or of *occasional* occurrence only, that has given birth to most of the ill-founded theories, which have heretofore prevailed on this subject. Those who considered morbid excess of heat, putrescency of the fluids, bile in the stomach and bowels, spasms, debility, &c., as constituting the *essential* part of fever, appear to me to have fallen into this error.

The following may be given as the general concourse of symptoms, denoting the attack and presence of fever in the system ; as well as its decline. It is furnished by an author of very extensive experience, and of acknowledged accuracy *. I may add, that it coincides with the history of the disease, as handed down to us by the best writers of all ages, and is confirmed by daily observation. The author alluded to, having studiously avoided giving any theory respecting the nature or proximate cause of fever, and indeed allowing of none †, his observations are free from all suspicion of bias on this score : the phenomena here mentioned may be justly considered, therefore, as comprising the *diagnostic* or *pathognomonic* symptoms of the disease in general. The *accessory* or occasional symptoms, which are the

* Vide *Elements of the Practice of Physic*, by George Fordyce, M.D. 8vo.

† “ What the real derangement in the system is which produces the external appearances in fever, is not at all known ; it is a disease, the essence of which is not understood.”—*Dis. on Fever*, No. I. p. 118.

causes of the varieties observed in fever, will be treated of more particularly afterwards.

The author in question divides the disease altogether into three stages; the first, or *cold stage*; the second stage, or *hot fit*; and the third stage, or *crisis*. This division it may be observed, applies with more strictness to the paroxysm of an *intermittent*, than to ordinary *continued* fever; in many cases of which, a *cold stage* is hardly to be perceived; while in many, likewise, the decline of the disease is slow and gradual, without any thing like a *crisis*, or sudden termination.

In the following descriptions I have marked certain symptoms in *italics*, because they afford the true *pathognomonic* characters, and tend to shew the real nature of the disease.

First stage. “The attack of fever, whenever it can be distinctly observed, is announced by the following symptoms, in greater or less degree.

“ (a) *Languor*, weariness, weakness, *insensibility of the extremities*; *blindness* and *insen-*

sibility in the other organs of sensation ; cold and trembling ; *pain in the back*.

“(b) *Horripilatio* ; the skin pale, dry, and of a dusky colour ; a dry, foul tongue, and thirst ; transparent urine ; costiveness, and suppression of other secretions ; paleness and dryness in ulcers ; a small obstructed pulse, sometimes intermitting ; pain in the limbs, joints, and *forehead* ; *delirium*.

“(c) *Anxiety* ; oppression and swelling about the *præcordia* ; frequency of the pulse ; quick and laborious respiration, sometimes with a cough ; rigor, and horror ; thirst, flatulency, loss of appetite, *nausea*, and *vomiting*.”

These are the symptoms which constitute the first stage of fever, and are properly characteristic of it : “according to the violence of these symptoms at any time of the disease, the fever is violent ; and when they are entirely carried off, it is cured *.”

* This description is borrowed, on account of its conciseness, from Dr. Fordyce's earlier treatise on the subject (*Elements of the Practice of Physic*,) it corresponds, however, entirely with the more detailed history given in the elabo-

Second stage. The symptoms of the *first stage*, above enumerated, soon give place to those of the *second stage*, which succeed each other in the following order:—"Rigor and horror; heat arising from the præcordia, and diffused over the body irregularly, unequally, and with flushing; a strong, full, *obstructed* * pulse; or a very frequent, small one; *pain in the head* and joints; *stupor* and *delirium*; *universal soreness*; redness arising in different parts irregularly; the urine high coloured, but

rate *Dissertations on Fever*, which terminated the professional career of this excellent physician.

* It is not easy to understand the import of the term *obstructed*, as here employed. It was, no doubt, intended to express a peculiar state of the pulse, very perceptible to the author himself; but it conveys no precise meaning to the reader. This may have arisen from the poverty of language, which is inadequate to communicate to others an idea of innumerable sensations that we ourselves perceive with great distinctness. This is the case with regard to the pulse in fever, which has certainly a peculiar *feel*, but which it is very difficult to describe in words. To my mind, the pulse of a patient labouring under fever, conveys distinctly the idea of a fluid moving under the finger; a sensation that is not excited by the pulse in health, and which is probably owing to a tremulous unsteady motion in the muscular fibres of the artery, arising from a change in the state of their irritability.

transparent; sweating in the head and breast, or over the whole body; partial secretions.

Third stage. “At last, the pulse becomes free; all the secretory organs are relaxed: hence the skin grows soft and moist, and returns to its natural colour; the tongue likewise is soft and moist, the belly is open, and the urine in greater quantity; if transparent when discharged, after a little time it becomes turbid and opaque, and at last deposits a copious sediment; the secretions are often greatly increased; there arises a copious and universal sweat, or a purging, or a great flow of urine.

“The frequency of the pulse, and all the other symptoms of the first and second stage, gradually subsiding, the patient recovers his health, but is considerably weakened.”

That the description now given includes the symptoms of fever in general, and not of any particular *species* merely, will appear from an examination of the disease, as it occurs in different climates and seasons, according to the observation of writers of the best credit.

The attack of the *slow nervous fever*, the

typhus mitior of modern nosologists, is thus described by Huxham. "The patient at first grows somewhat listless, and feels slight chills and shudders, with uncertain sudden flushes of heat, and a kind of weariness all over, like what is felt after great fatigue: this is always attended with a sort of heaviness and dejection of spirits, and more or less of a load, *pain*, and *giddiness of the head*; a *nausea* and disrelish of every thing soon follows, without any considerable thirst, but frequently with urging to vomit, though little but insipid phlegm is brought up. Though a kind of lucid interval of several hours sometimes intervenes, yet the symptoms return with aggravation, especially towards night: *the head grows more heavy or giddy*, the heats greater, the pulse quicker, but weak, with an oppressive kind of breathing. A great torpor, or an obtuse kind of coldness, affects the hind part of the head frequently, and oftentimes a heavy pain is felt on the top, all along the coronary suture; this, and that of the back part of the head, generally attend ner-

vous fevers, and are commonly succeeded by some degree of a *delirium**."

The first symptoms of *putrid, malignant, and petechial* fevers, are thus described by the same author. "In general, these fevers attack with much more violence than the *slow nervous*; the rigors, if any, are greater (sometimes they are very great), the heats much sharper and permanent, yet at first sudden transient, and remittent; the pulse more tense or hard, but commonly quick and small, though sometimes slow and seemingly regular for a time, and then fluttering and unequal. The *headache, giddiness, nausea*, and vomiting, are much more considerable, even from the very beginning. Sometimes a severe fixed *pain* is felt in *one or both temples* or over one or both eyebrows, frequently in the *bottom of the orbits of the eyes*. The eyes always appear very full, heavy, yellowish, and very often a *little inflamed*. The countenance seems more bloated and dead-coloured than usual. Commonly, the *temporal arteries throb much*, and a *tinnitus aurium* is very

* Essay on Fevers, Chap. vii.

troublesome. A *strong vibration, also, of the carotid arteries* comes on frequently in the advance of the fever, though the *pulse at the wrist may be small*, nay even slow. The *prostration* of spirits, weakness and faintness, are often surprisingly great and sudden, though no inordinate evacuation happens; and this, too, sometimes when the pulse seems tolerably strong*.”

The following are given by Dr. Lind, as the leading symptoms of a fever which occurred on board a ship of war, during the rainy season at Gambia on the coast of Africa, in the year 1769. “In the mildest form,” says he, “it began with a *headache*, a sickness at the stomach, thirst, universal uneasiness and pain, especially in the *back* and loins. The pulse was small and quick, the skin, hot and dry. In the morning, these complaints were greatly relieved, in the evening exasperated; which happened through the whole course of the fever.”—“In the more malignant form of the fever, all the symptoms were more violent; there was from the beginning a great *prostration of strength and spirits*,

* Essay on Fevers, Chap. viii.

universal uneasiness, *giddiness*, violent retchings, a strong, quick, and sometimes a hard pulse, a white and dry tongue; sometimes a severe purging with gripes; at other times a bad cough, a *violent pain and stricture over the eyes, and costiveness* *.”

In the province of Bengal, in the East Indies, fevers are observed to make their attack in the following manner:—“*Impetus morbi plerumque subitaneus est, et incipit sensu debilitatis, ac ingenti spirituum prostratione; accedunt frigiditas modo major modo minor, vertigo, nausea, capitis et lumborum acerrimi dolores, manuumque tremores; vultus est pallidus, cutis vulgo arida et constricta, oculi languidi ac graves, celer at exilis pulsus, anhelitus plerumque difficilis et singultibus interceptus.*”—“*Remittente febre, pulsus fere ad naturalem conditionem redit; manent tamen capitis atque lumborum dolores licet leviores, ut et sapor oris ingratus, et prostratus appetitus*†.”

The endemic of Batavia is well known to be

* Lind on Hot Climates, p. 55, 56.

† Lind, Diss. Inaug. de Feb. Putrid. in Bengalia, 1762.

a fever of the most destructive nature. "This fever," says the author before quoted, "was of the remitting kind. Some were seized suddenly with a *delirium*, and died in the first fit; some survived the attack of a third fit*."

The symptoms that accompany the attack of *yellow fever* in the West Indies, are so much the same with those above described, that it would be a mere repetition to quote them. Nor, in *autumnal* fevers, as they occur in Europe, is there any essential variation from those already described. The fever which proved so destructive at Cadiz, in September and October, 1764, and of which an hundred persons often died in a day, attacked in the following manner:—"It began commonly with alternate slight chills and heats, nausea, *pains of the head*, of the back, of the loins, and at the pit of the stomach. These symptoms were often followed, in less than twenty-four hours, with violent retchings, and a vomiting of a green or yellow bile, the smell of which was very offensive. Some threw up a humour

* Lind on Hot Climates, p. 90.

black as ink, and died soon after in violent convulsions, and in a cold sweat. The pulse was sometimes sunk, sometimes quick, often varying. After the first day, the surface of the body was generally either cold, or dry and parched. The *headache* and *stupor* often ended in a *furious delirium*, which proved quickly fatal *."

Mr. Dewar (an army surgeon), describing the fever which prevailed among the British troops at Minorca, in July, 1800, says—"For a whole week, sixteen men on an average were taken ill each day. Their complaints, for the most part, came on suddenly, and very often when they were on the parade. After slight languor and debility, the patient was all at once seized with *violent headache*, *giddiness*, pains and *extreme debility* in the lower extremities, rendering him totally unable either to stand or walk. When he was brought to the hospital, we found him labouring under all the symptoms of the most violent pyrexia, increased heat, quick pulse, and urgent thirst. Two or three of them had

frequently alternations of heat and cold ; but in all the rest the preternatural heat of the skin was constant, and the patients' feelings uniformly hot and oppressive. *The symptom of which they all most violently complained, was the excruciating headache.*" He adds just afterwards, "the headache is attended with an *external heat much greater in the head* than over the rest of the body, *indicating a peculiar force of increased action in that part of the system* *." The fever above described was not peculiar to any particular class of persons, but prevailed generally among the troops, and also the natives of the island.

In the *plague*, the most violent and malignant of fevers, the first symptoms are of the same general nature. "The symptoms of the plague vary," says De Mertens, "according to the different constitutions of the persons whom it attacks, and the season of the year in which it appears. Sometimes it wears the mask of other diseases ; but in general it is ushered in by *headache, stupor resembling in-*

* Med. and Phys. Journ., No. 59.

toxication, shiverings, depression of spirits, and *loss of strength*; these are followed by some degree of fever, together with nausea and vomiting. The *eyes become red*, the countenance melancholy, and the tongue white and foul*.”—The descriptions of the plague afforded by other authors, coincide very exactly with that now given.

An examination of other histories of the disease would concur with the above in shewing that fevers of all descriptions, from the low *nervous* fever, to the *plague* itself, are characterized by the same essential symptoms, differing only in degree. Nor is this true of fevers of a *continued* form only, but is applicable to *intermittents* also; and even to fevers of a specific kind, as the *exanthemata*, the early stages of which are often not to be distinguished from ordinary fevers, so nearly do the symptoms correspond; while the paroxysm of an *intermittent* has all the leading characters of *continued* fever.

While, however, it is admitted, that the

* Account of the Plague which raged at Moscow in 1771, by Charles De Mertens, M.D. English edition.

different descriptions of fever given above, include all that is essential towards characterizing the disease, it is, at the same time, of importance to observe, that, in none of them, are the natural series and order of symptoms sufficiently attended to. The *primary* symptoms will be found blended with those that are of *secondary* occurrence; the *local*, with the *general* or constitutional; the *essential*, with the *accidental*; and those that are peculiar to, and distinctive of, fever, with such as are common to it with other diseases. Hence, as it appears to me, an erroneous mode of reasoning has been frequently adopted, and false conclusions drawn, in regard to both the *seat* and *nature* of the disease. The natural and proper arrangement of the symptoms of fever will be best seen, when the phenomena of the disease have been more particularly examined, and their relation to the different functions shewn.

I shall set out with stating the general doctrine here contended for, and which is comprized in the following propositions:—

1. *Idiopathic* fever, as it is termed, is essen-

tially a *local* disease, and not *primarily* a general affection of the system, as has commonly been believed.

2. The proper and exclusive seat of it, is the brain.

3. It consists in actual inflammation of the general cerebral substance.

This, it may be objected, is a theoretical mode of proceeding with the inquiry, and assumes as proved, the points in dispute. The objection, however, will be of little weight, if it shall appear that such a mode of proceeding will have the effect of placing the subject in a clearer point of view, as I believe to be the case; while, by so doing, it is not the less open to investigation.

In order to render the subject intelligible, it is necessary to advert to, and to have constantly in mind, the peculiar nature of the brain and its functions, as well as the influence it exerts over the rest of the system.

The brain is the organ of *sensation* or conscious feeling, of *voluntary motion*, and of *mind*.

These are its proper or *special* functions, the

sensorial functions, as they are termed. It exerts also an influence, more or less direct, over the rest of the system, so that every part is subject to it, in greater or less degree.

The brain, or *encephalon*, is not to be considered as a single organ, but rather as an assemblage of organs, each differing from the rest in structure and in function: one part being destined to the purpose of *vision*, another of *hearing*; and so on. And seeing that the different nerves have each their separate origin in the brain, it is consistent with the fairest analogy to infer, that according to the particular part of the brain affected by disease, so will be the disturbance observed in the rest of the system; and thus may be explained much of the variety observed in fevers: in some of which, the functions of the stomach, or heart, are greatly disturbed; while in others, they are but little altered from the healthy state.

I shall proceed now to inquire into the state of the different functions in fever, referring to the general history of symptoms above given.

SECT. II.

STATE OF THE SENSORIAL FUNCTIONS IN FEVER.

It is in the *sensorial functions*, those which are in immediate dependence upon the brain, namely, the *external senses*, the *voluntary*, and the *intellectual* powers, that the proper *diagnostic* symptoms of fever are to be found; for throughout the whole course of the disease, from the first attack to its termination, this class of functions is invariably observed to be imperfectly performed, or more or less perverted from the natural and healthy state.

The *organs of sense* are always preternaturally affected in fever. In the mild form of the disease, the *low nervous fever*, or *typhus mitior* of nosologists, a degree of torpor and insensibility frequently involves all the senses. “*Omnes corporis sensus*,” says Huxham, “*maxime depravantur; vix ægri vident oculis apertis; perditur olfactus, perditur auditus, vix etiam*

sapidissima *gustant* ; torpent adeo membra, ut parum admodum sentiscant vel acerrima vesicatoria ; *obstructo nimirum sensationis medio* *."

It is more common, however, for the organs of sense to be deranged in the opposite way, especially in the early stages of the disease. *Light* and *sound* are generally intolerable to the patient, in the beginning of fever †. The senses of *smell* and *taste* also become preternaturally acute, and probably perverted ; so that *nausea* and vomiting are excited by odours and flavours, which were scarcely perceptible in the state of health, or which even used to be perceived with pleasure : the patient loaths food and drinks that are at other times the most agreeable to him. The sense of *touch* becomes equally exalted ; hence the *universal pains* which torment the sick, and which render him scarcely able to bear the weight of his body in bed. Towards the decline of the disease, torpor usually succeeds to this state of excitement. *Dulness of hearing* is then particularly re-

* Huxham *De Febre lenta Nervosa*, 154. 8vo.

† Fordyce's *Dissertation on Fever*, No. 1. p. 2.

marked, and frequently denotes a favourable issue. The acuteness of the other senses commonly disappears at the same time.

In violent or *malignant* fever, there is often, from the first, an almost entire abolition of sense, strongly resembling apoplexy, or the stupor of intoxication ; for which, indeed, it has frequently been mistaken.

There is, however, great inequality in the affection of the different *organs of sense*, in different individuals. In some, *vision* becomes too acute, while *hearing* is little affected. In others the reverse takes place. This difference may reasonably be ascribed to the particular part of the brain that is suffering from the disease.

This constant derangement of the *organs of sense* in fevers, clearly indicates an affection of the *sensorium*, on the healthy state of which they so immediately depend for the due performance of their several functions. Nor is the opinion in any degree disproved by the varying condition of the *sensibility* in fever, as above noticed ; while this circumstance appears to me

quite inexplicable, on any of the other hypotheses that have been given, respecting the nature of the disease.

With regard to the *voluntary power*, every history of genuine fever, of whatever species, shews this function to be greatly impaired and disordered. Prostration of muscular strength is one of the few symptoms which seem particularly to characterize fever, and to adhere to it in all its stages. It is obvious indeed in every movement of the patient, and is strongly depicted in the countenance, the features of which are relaxed, dull, and without animation. To this are to be referred the *languor*, lassitude, and indisposition to motion, which are so remarkable at the first attack of fever, and which continue, in greater or less degree, throughout its course. Its dependence on the fever is evident from this, that it ceases immediately with the paroxysm, and again recurs with it.

The debility or prostration of strength which takes place in fever, is altogether different from ordinary weakness of system, such as proceeds from immoderate evacuations, inanition, or pro-

tracted disease; it is different, also, from the weakness that is observed in the intervals of the paroxysms of fever. In ordinary weakness, the person is unable to make the usual exertions of health; in the weakness produced by fever, he is both unable and indisposed to do it. The former is permanent; the latter is temporary only, and ceases immediately with its cause. And thus it is, that *blood-letting* in fever, by relieving the disease in the brain, often restores at once the muscular strength, while at the same time it diminishes arterial action.

This state has been aptly termed *depression of strength*, rather than absolute weakness, and may be compared with a spring that is overcome by a superior force, but which still retains its power of acting, ready to exert itself as soon as the compressing force is withdrawn. It is so constant a symptom in fever, that it has been admitted amongst the distinguishing characters of the disease, by the latest and best observers. Sauvages, in his definition of fever, says—"Semper virium prostratione majori, quam a virium vitalium gradu foret expectandum."—In other

words, the *voluntary power*, which derives its energy immediately from the brain, is greatly depressed, beyond what the *pulse* would seem to indicate. Sagar also makes this symptom a part of his definition of fever—"viribus *vitalibus* (pulsu et respiratione) vix mutatis: virium *artuum*, summa prostratio."

Such, invariably, is the condition of the *voluntary power*, in even the slightest case of fever, and that from the very commencement of the disease. In violent cases, even from the beginning, and in the more advanced stages of the disease in general, the voluntary muscles are not only thus weakened, but disordered in their actions, in the highest degree. In these circumstances it is, that muscular *tremors* take place (*subsultus tendinum*, as they are called), and the tongue trembles, when put out for examination; while the semi-voluntary muscles, the *sphincters*, often cease to perform their office altogether. Those of respiration, likewise, often partake of the general loss of power in the muscular system; and thus breathing is performed with labour and difficulty, and

very imperfectly : in consequence of which, the blood passes with difficulty through the lungs, obliging the patient to make frequent deep inspirations, thus occasioning that propensity to sighing, which is so remarkable in severe cases of fever ; as it is likewise in the *acute hydrocephalus*, in certain stages of that disease.

In reference to these symptoms, it is almost needless to remark, how immediately dependant the *voluntary power* of the system is on the brain ; or how strongly every great depression or disorder of it, indicates a morbid condition of this organ.

With respect to the *mental functions*, these are always observed to be more or less impaired or disturbed in fever, and that in proportion to the violence and danger of the disease. In the slightest affection of the sort, and in the early stage, the powers of mind are weakened merely. Attention to any object of pursuit becomes then difficult and painful to the patient, aggravating the headache, under which he is usually suffering. The spirits flag ; and

there is either too much, or too little irritability of mind. As the disease advances, or is from the first more violent, the mental disorder increases in proportion. Hesitation in reply, and confusion of thought, then appear, especially on first awaking. To these succeeds *delirium*, that becomes at length continual, but which is commonly of a low and muttering kind; arguing an *oppression* of the powers of mind no less than of those of the body. In some cases, the mind is more actively disturbed, especially at night, so as to require force to keep the patient in bed.

Delirium, indeed, may be ranked among the most ordinary occurrences in fever; for the disease rarely, if ever, proves fatal, without this symptom manifesting itself: and it can hardly be necessary to remark, that such a symptom is an infallible indication of a morbid condition of the brain. “*Ponit semper delirium*,” says Boerhaave, “*cerebri medullaris affectionem morbosam* *;”—“*quoniam*,” subjoins his illustrious commentator, “*in medulla cerebri ille locus*

* Aph. 701.

est, unde idearum ortus pendet*.” That this impaired and frequently disordered, state of the *mental functions* is not a mere casual and unimportant feature of the disease, but an *essential* part of it, is proved, both by its constant occurrence, and especially by its bearing so close a relation to the degree and danger of the disease. To refer the delirium in these cases, as has been done, “to some inexplicable sympathies of the nervous system,” is merely substituting sound for sense, for such language carries with it no distinct or intelligible meaning.

In great and fatal affections of other organs than the brain, the powers of mind frequently continue unimpaired to the last. Persons dying of *hernia*, or mortification of the intestines, from any cause; peripneumony, phthisis, and many other diseases, are often competent to direct the future administration of their affairs, within a very short period of their dissolution. But this is far from being the case

* Van Swieten, *Comm.* p. 701. 4to.



in fever. In slight cases, such an exertion of mind would be difficult; and, in severe ones, quite impracticable.

The state of the patient in regard to *sleep* and *watching* in fever, is always different from that of health. In some cases, in certain stages of the disease, want of sleep (not the result of pain) is a constant symptom, and one which the practitioner is in general too solicitous to overcome, by the use of opium, or other narcotics; at other times, drowsiness or stupor prevails. When sleep does occur in fever, it is for the most part unquiet and unrefreshing; the patient dreams of dangers and precipices, and wakes suddenly in a fright. Such irregularities in regard to *sleep*, and *watching*, which are merely different conditions of the brain, serve, with the other symptoms, to shew strongly a disordered state of this organ.

There are many other phenomena of the *nervous system* in fever, which point clearly to the brain, as their source. *Epileptic fits* are often the precursors of an attack of fever, by whatever cause induced, especially in the

more irritable bodies of infants : irregular movements of the eyes and eyelids, the latter remaining half open during sleep, grinding of the teeth in sleep, in addition to the *convulsive tremors* of the hands and tongue, and the *paralysis* of the *sphincter* muscles, before noticed, accompany almost every bad case of fever : and that they depend upon a topical affection of the brain, is rendered probable by this, that such symptoms are found to occur from external injuries inflicted on this organ.

In warm climates, fevers are often accompanied with universal spasmodic affections, *opisthotonos*, *emprosthotonos*, and the like ; and I have often witnessed in the fevers of this country, a degree of *tetanic* contraction of the muscles of the neck and limbs. It may be added further, that fevers frequently leave behind them palsy, epilepsy, fatuity, mania* ; all of them indubitable indications of antecedent disorder of the brain.

The general cast of countenance in fever is

* Huxham's *Essay on Fevers*, p. 88.

so strongly marked, as to enable one to recognize the disease on the first inspection of the patient. The dull unmeaning eye, and the general want of expression in the features, have been noticed by all observers, and afford evident indications of the principal seat of disease. They serve indeed to denote the presence of genuine fever, much more strongly, than either the excess of heat in the skin, the quickness of pulse, or the foul tongue; all of which are very variable in fever, and to be found in a number of other diseases. In these, extreme debility is often found; but there is nothing of that stupid stare, or muddy, blood-shot eye, or dull unmeaning look, which at once characterize brain affections, and distinguish them from all other disorders. "Topical affections of the brain," says Dr. Cullen, "generally discover themselves in the face, both in consequence of its proximity, and of the distribution of its nerves, which arise immediately from the brain*."

* *Clinical Lectures*, 8vo. p. 118.

To all this it may be added, that the feelings of the patient in simple fever point uniformly to the head, as the chief seat of complaint. In the first days of the disease, and before it is fully formed, *pain in the head* is an almost invariable symptom. In the further progress of the disease, headache often ceases to be complained of; but the increasing disturbance in the state of the *sensorial functions*, accounts for the cessation of pain, and points still more strongly to the real seat of the disease. The natural insensibility of the organ is likewise to be taken into account here, making brain affections often less painful than many others.

Along with *headache*, pain in the back and loins is usually conjoined, and is probably to be referred to the connexion of the spinal marrow with the brain, of which it is, in fact, merely a continuation*.

It appears, therefore, from what has been

* “*Spinæ medulla minime maximus nervus, sed pars tantum cerebri potest haberi; notæ enim ejus ab omnium nervorum notis, sunt diversæ, cerebri vero notis respondent.*”
—Sömmering, *De Corp. Hum. Fab.*, tom. 4. § 73.

said above, that the *sensorial functions*, to wit, *sensation, voluntary motion, and mind*, all of which depend immediately on the brain, and vary with every variation in the state of this, are constantly more or less disturbed in every case of fever. The other functions are neither immediately dependent on the brain, nor are they *primarily* and essentially disturbed in fever ; as will be presently seen. It is not in these, therefore, that the characteristic symptoms of the disease are to be looked for.

SECT. III.

OF THE STATE OF RESPIRATION IN FEVER.

IN other diseases, provided the organs of respiration are not themselves attacked by inflammation, respiration is not otherwise affected, than as may be attributed to a more rapid, or otherwise disordered state of the circulation. But in fever the case is far different. *Sighing*, *anxiety*, and a sense of oppression at the *præcordia*, are among the most frequent symptoms of fever, especially in the *cold stage*. But although these uneasy feelings have their immediate seat in the region of the heart and lungs, they may be referred *primarily* to the disordered state of the *sensorium*, as they are found to accompany other morbid affections of the brain.

The muscles of respiration are partly subject to the will, and are so far, like the other muscles of voluntary motion, in immediate de-

pendence on the brain. In the general depression of the voluntary power which takes place in fever, the muscles of inspiration must suffer in some degree; hence the chest is less perfectly dilated, and the blood, in consequence, more difficultly transmitted through the lungs. This gives rise to an undue accumulation of blood about the heart, the uneasiness excited by which occasions an unusual effort to expand the chest. In this way, I think, may be explained, in a great measure, the sighing, anxiety and oppression at the præcordia, above alluded to, which take place in the *cold fit* of fever more particularly, when the debility of the voluntary muscles is in the extreme. The uneasy feeling in this case is relieved both by *sighing*, (or deep inspiration,) and by *yawning*, in which the cavity of the chest is expanded to the utmost.

Something in this case may be attributed, also, to the general insensibility which accompanies the *cold fit* of fever, under which the necessity for regular respiration is imperfectly felt, and the intervals of breathing consequently

protracted: this, of course, occasions an accumulation of blood on the right side of the heart, and induces a necessity for deep inspiration. It is in proof of this, that where pressure exists on the brain, as by effusion of *serum* or other causes, respiration is slow, and interrupted with frequent sighs: and the same thing occurs, when the mind is deeply engaged in the contemplation of any object.

It is remarkable, that before the hot stage of fever is fully established, and while the extremities are still cold, and the skin dry, the sense of anxiety and oppression about the heart, is exceedingly distressing to the patient. But as soon as a general warmth and perspiration take place, this uneasiness in a great measure disappears. Some part of the distress felt in this case, is doubtless to be ascribed to the accumulation of blood about the heart and lungs, in consequence of the contracted state of the capillaries.

The *sallow, lurid hue* of the skin, which is so remarkable in the violent or *malignant* form of fever, is probably owing, in part at least, to the

imperfect change which the blood undergoes in the lungs, from the cause above mentioned. No such appearance is observed in those fevers, where both the circulation and respiration are actively performed; as in what is called *inflammatory* fever.

SECT. IV.

OF THE STATE OF THE SANGUIFEROUS SYSTEM
IN FEVER.

IN order to understand the condition of the *sanguiferous* system in fever, it is necessary to advert to the connexion of that system with, and its degree of dependence upon, the brain.

Although the brain exerts a paramount influence over every part, there is yet a striking difference in this respect, in regard to different functions. The *sensorial functions*, as before observed, are in immediate and close dependence upon the brain, which is, in fact, the organ specially devoted to them. But the action of the heart and arteries is, to a certain extent, carried on independent of the brain, as is shewn by its continuance, often, with little change, in cases where great and serious injuries have been inflicted on that organ; and likewise in many diseases of the brain, in

which the pulse sometimes varies little from the healthy standard, although the patient be in extreme danger.

That the *sanguiferous* system, however, is not wholly withdrawn from the influence of the brain, is shewn by different circumstances, that regard both the heart and blood-vessels. The instantaneous effect of *mental emotions*, such as *fear* and *terror*, in producing contraction of the extreme vessels, and disordering the action of the heart, is a sufficient proof of this; as is the general excitement of the heart and arteries, produced by *anger* or *joy*. In injuries and diseases of the brain, also, the pulse is liable to be rendered preternaturally quick, or slow, or irregular; according to the nature and extent of the injury or disease present.

The *comparative* independence of the heart and arteries on the brain, appears to be provided for by a peculiarity in regard to their supply of nerves. The organs which serve simply for the support of life, receive very few of their nerves immediately from the brain; but are supplied from ganglions, which, to

them, probably, act as brains, serving for the accumulation and supply of nervous energy. This is the case with the heart and vessels, the intestines, kidneys, liver, and, in short, the *viscera* in general; all of which derive their nerves principally from the *great intercostal*, a nerve that cannot so properly be said to arise from the brain, as from numerous ganglions, which appear to be the source and center of nervous energy to these parts, as the brain itself is to the organs of sense and of voluntary motion.

The *sanguiferous system*, in proper or *idiopathic* fever, is for the most part in a similarly excited state, as in all other inflammations that are of sufficient magnitude and violence to disturb the general system; and the same phenomena are present, in both cases; namely, frequency of pulse, heat of skin, and a furred tongue; with, in general, a suppression or diminution of the various secretions. Hence it is not to be wondered at, that the same term, *fever*, expressive merely of increase of heat, should be applied in both cases, and often with little dis-

crimination. Nor, indeed, is there any real difference ; for in both cases, the *pyrexia*, or febrile symptoms, are but a secondary part of the disease, symptomatic of the topical inflammation, which, in *proper* fever, is seated in the brain, in the other cases, in a different organ.

From the comparative independence of the *sanguiferous system* upon the brain, it is, that in many cases of *idiopathic* fever, just as in other inflammations, the general circulation, as determined by the pulse, is carried on with little deviation from the healthy state ; while in others, it is greatly hurried, irregular, or even preternaturally slow ; so that no perfect judgment can be formed, with regard to the degree and danger of fever, from the pulse alone ; nor in fact, from any thing, but the state of the *sensorial functions*.

A *quick* or *frequent* pulse has, by many physicians, been made the criterion of fever*. But in this case, the term *fever* has been em-

* “ *Febris dignoscitur pulsu citato.*” Linnæus, *Gen. Morb.*

ployed in its greatest latitude; as including the ordinary febrile state of system, which is the consequence of inflammation in general. In *idiopathic fever*, (or *brain fever*, as it might be more justly termed, in allusion to its primary and essential seat in the body) *frequency of the pulse* is by no means a necessary, nor a constant symptom; for we have the testimony of the best authors to prove, that in some fevers, the pulse is even slower than natural; while, in a great many others, and those often of the most *malignant* character, it scarcely varies from the healthy standard.

Hodges, in his description of the plague which prevailed in London in his time, says, "the pulse, which in all other diseases is almost a certain index, in this sickness could not at all be trusted to *." Sydenham, in various parts of his writings, remarks, that in fevers, even of the most *malignant* and fatal stamp, the pulse sometimes hardly varied from the natural. "Many have a good pulse in this fever," (the

* Hodges' *Treatise on the Plague*, p. 103.

yellow fever of the West Indies) says Lind, "even a few hours before death." (Lind on *Hot Climates*, p. 257.)

Fordyce says—"a fever may be present in a great, and even in a fatal degree, without the pulsations being increased in frequency*."

Dr. Rush, of Philadelphia, observes, that he saw some ill of the *yellow fever*, whose pulse beat only forty times in a minute; and Dr. Wittmann, in his account of the *malignant fever* which prevailed in Syria, in the year 1801, remarks, that in the worst cases, where constant delirium, dilated pupils, *petechiæ*, yellowness of the eyes and skin, coldness of the extremities, &c. were present, the pulse was scarcely changed, and by no means indicated danger †.

A host of other authors might be cited, in proof of the same circumstance, in regard to *malignant* and *pestilential* fevers; as Werlhoff ⁽¹⁾, Gredingius ⁽²⁾, Prosper Alpinus ⁽³⁾,

* *First Dissertation on Fever*, p. 18.

† Wittmann's *Travels in Syria*, 4to. p. 79.

⁽¹⁾ Werlhoff *de Cautione*, p. 39, *et de Variolis*, p. 37.—

⁽²⁾ Ludwig. *Advers. Med. Pract.* v. i. c. 1.—⁽³⁾ *De Med.*

Nicolaus Massa ⁽⁴⁾, Rye ⁽⁵⁾, Russel ⁽⁶⁾, Bordeu ⁽⁷⁾, and Sauvages ⁽⁸⁾. While Tremellius ⁽⁹⁾ and De Haen ⁽¹⁰⁾ make a similar remark, with regard to *inflammatory* fever. My own observation would lead me to say, that, so far from *frequency of pulse* being a criterion of the degree or danger of *idiopathic* fever, those cases upon the whole, are the least dangerous and the shortest in duration, in which the pulse is the most quickened at the outset of the disease.

Independently of mere *frequency*, however, which may, or may not, be present, there is a condition of pulse, which is highly characteristic of *simple* fever; and which serves to distinguish it from other inflammations. This is a peculiar *softness*, attended with an unsteady, tremulous, or *vibratory* motion, and which probably arises from a change in the irritability of the muscular fibres of the artery, in consequence of which, instead of contracting steadily

Ægypt. 1. i. c. 14.—(4) *De Feb. Pestil.*—(5) *Med. Stat. Brit.*—(6) *Nat. Hist. of Aleppo*, 4to. p. 230.—(7) *Recherches sur le Pouls.*—(8) *Nos. Method.* tom. 2. p. 307—(9) *Exam. Frigor. Feb.* p. 7.—(10) *Rat. Med.* p. 12. c. 2.

and simultaneously, as in health, they act as it were, individually, and in succession. This *softness* of the pulse is accompanied with laxity, or want of firmness in the whole of the animal solids, and may without difficulty be referred to the disordered, and more or less *oppressed*, state of the brain; upon the condition of which, the contractility of the whole muscular system principally depends. If the fever should be complicated with another inflammation, the pulse in that case often acquires a degree of hardness, that does not belong to *simple* fever.

The appearances on the skin, termed *petechiæ*, *maculæ*, *vibices*, and *ecchymoses*, (in vulgar language, the *purples*, or *spotted fever*,) which frequently accompany the worst form of the disease, are to be ranked among affections of the *sanguiferous system*. Some of them evidently proceed from effused or extravasated blood, in the texture of the skin; for they are not removable by pressure. They have usually been attributed to a *putrescent* state of the general mass of blood; in consequence of which, as is supposed, its *crasis* being broken down, the

blood escapes from the vessels, by a kind of *exsudation*, occasioning the appearances above described, and giving rise, in the same way, to *hæmorrhages* from the different excretory organs.

Such an explanation, though plausible, is attended with considerable difficulties. Some of the appearances mentioned, are transitory and inconstant; often disappearing within the space of a few hours, merely by the use of *tonic* and *stimulant* remedies;—remedies, which could have no immediate effect in altering the general condition of the vital fluid. Dr. Donald Monro mentions a case of *intermittent fever*, in which *petechiæ* appeared only during the paroxysm*; they have been observed likewise where the blood, drawn from the arm, has exhibited a dense, buffy surface, as well as in a broken and dissolved *crasis* of it. The phenomena in question may be better explained by reference to the state of vascular action, as regards the *capillaries* more particularly, than by any supposed alteration in the condition of the general mass of blood.

* Diseases of Military Hospitals.

The excitability, and power of contraction, of the blood-vessels, there can be no doubt, depend, more or less directly, on the influence of the brain and nerves. In living animals, the blood is retained within its proper channels, more by the contractility of vessels, than by the smallness of their diameters. For it has been found on experiment, that when recent fluid blood is injected into the arteries of a living animal, it is confined to the vessels which naturally carry red blood; but when the animal is suddenly deprived of life, as by division of the spinal marrow, the injected blood is found to enter vessels which, in the natural state, convey only the colourless part of it, as those of the *periosteum* and other membranes, tinging them of a red colour.

The purple spots, the yellow and livid streaks observed in various parts of the body, the *maculæ*, *vibices*, and *hæmorrhages*, therefore, which so often accompany *malignant* fevers, are rather, I think, to be attributed to a torpid, or nearly paralytic, state of the extreme vessels, in consequence of which the blood stagnates in

their extremities, or is poured out into the adjoining cellular membrane*. This torpor indicates, as in other paralytic cases, an impaired state of the nervous power, arising from the disturbed condition of the brain. In confirmation of this it may be mentioned, that Lieutaud found the brain, after death, to be *organically* diseased, in some patients that laboured under *petechiæ sine febre*†. And in a case that occurred lately, in the practice of the General Dispensary, of what is called *purpura hæmorrhagica*, attended with very little general febrile action, a number of *coagula* of black blood, some of them larger than a hazel nut, were found imbedded in different parts of the substance of the brain, with great destruction of the organization of the surrounding parts‡.

I thought the brain had nothing to do with sanguiferous system.

D.C. means I suppose that all the affections of the brain do not affect the motions of the heart still they may affect the distribution of the blood thro' the nerves.

* It is remarked by Sir John Pringle (p. 304.), that, in some cases of *malignant fever*, *petechiæ* made their appearance after death.

† *Hist. Anat. Med. Obs.* 148, 211.

‡ It is highly deserving of notice in this case, that although so much mischief was detected in the brain after death, the *sensorial functions* were proportionally but little disturbed. The *mind* was never disordered; the *senses* continued per-

The opinion is rendered further probable, from observing the effects of certain *poisons*, which manifestly exert their chief influence on the brain and its functions. In animals killed by the *laurel-water*, and similar narcotic poisons, the red blood has been observed to pass into the serous vessels*. And the bite of the serpent *hæmorrhous* is said to occasion such a dissolution of the blood (or, as I should prefer saying, such an atony or *paralysis* of the extreme vessels), that it flows from every pore, destroying the patient by an universal hæmorrhage†. At the same time, it is not improbable that the blood itself, admitting it to be possessed of the living principle, undergoes a change in its properties, in common with the living solids; though with the precise nature of this change we are unacquainted: it ap-

fect; and the only circumstance that occurred, particularly indicative of *brain affection*, was a very slight, and scarcely observable degree of *hemiplegia*, and which was noticed a few hours only before death.

* Cullen's *Mat. Med.* Vol. ii. p. 286.

† Mead on *Poisons*.

pears, however, to be such as to influence materially its power of coagulation.

The appearances above described, as taking place in certain states of fever, are nevertheless generally preceded by, and are perhaps in some degree a consequence of, excess of action in the *capillary* vessels; for there is such a degree of redness and pungent heat, in the skin in these cases, as clearly proves an excited or inflammatory action to be going on in the part. Formerly, when the *hot regimen* was in general use in the treatment of fever, such appearances were exceedingly common. But at present, that fever patients are allowed to breathe a cool and pure atmosphere, and the excessive heat of the body is carried off by frequent ablutions, they are of very rare occurrence.

Amidst the *vibices* and spots of extravasated blood on the skin, there are generally a number of minute but actual inflammations, the redness of which disappears upon pressure. *Petechiæ* themselves are of this nature, and not the effect of extravasation; as may be easily determined upon examination.

The purple spots, the *vibices*, and other marks of extravasation therefore, that are occasionally observed in fever, may be considered, as, in some measure, the result of previous excitement of the capillary vessels; which is further probable, from their occurrence, occasionally, in *malignant* cases of *small-pox*, where they are found interspersed among the pustules. Such excited action of the vessels, however, would not necessarily be followed by rupture and effusion of blood, unless a peculiar tenderness of texture, or want of cohesion existed in the vascular structure. Such tenderness is to be referred, probably to the *oppressed* condition of the brain, by which the *vitality*, and *cohesion* of the living solids, are at once diminished.

There are other phenomena of the *sanguiferous system*, that frequently present themselves in fever, and which have been much employed in speculations in regard to its *intrinsic* nature, or *proximate cause*, as it has been called. This has been the case particularly with regard to the *coldness* and *contraction* of the extreme

vessels, which usher in so many fevers. These symptoms have been supposed to indicate, at once, *debility* of the capillaries on the surface, and deficient energy of the nervous power in general*. And as the *cold fit* has been thought to be the *primary* link, in the chain of effects produced by the agency of the *remote causes* of fever, *debility* has consequently been supposed to constitute the essence, or *proximate cause* of the entire disease.

Without attempting to explain the way in which the symptoms mentioned are produced by the *remote causes* of the disease, it may be observed, that they are not essential to fever, since many fevers begin without any perceptible rigors or *cold fit*. Nor are they peculiar to *idiopathic* fevers, but belong equally to the *symptomatic*; and are also observed to accompany most great and sudden changes that take

* "Upon the whole, our doctrine of fever is explicitly this. The remote causes are certain *sedative* powers applied to the nervous system, which diminishing the energy of the brain, thereby produce a debility in the whole of the functions, and particularly in the action of the extreme vessels."

First Lines of the Practice of Physic. By Dr. Cullen. § 46.

place in the system. Thus, various topical inflammations, as well as fevers, strictly so called, are ushered in by *rigors* and a *cold fit*; and the same symptoms again appear, when extensive *suppuration* is about to take place in any part of the body; and often upon the introduction of a catheter into the *urethra*. They are observed also at the approach of *parturition* in women, and are often produced by *mental affections*. They cannot, therefore, be considered as affording any elucidation of the peculiar nature of fever, or of its particular seat in the body.

Enough, I think, has been said to prove, that with no propriety can *idiopathic* fever be said to be an affection of the general vascular system, or to consist merely in disordered circulation; since it appears that, on numerous occasions, and those even where the disease is most strongly characterized, the heart and arteries continue their functions in a great measure unchanged. The febrile symptoms, namely, the hot skin, the quickness of pulse, and the furred tongue, when they do occur in *proper* fever, (as indeed is very generally the

case,) are as truly *secondary* in the order of their occurrence, as in other inflammations, and merely symptomatic of *topical* disease, the essential seat of which, in this case, appears to be *the brain*. It is no doubt true, that, in certain states of fever, the pulse is more disturbed than is usually observed in other inflammations (with the exception of that of the heart); being, at different times, extremely *irregular, quickened*, or even preternaturally *slow*. This diversity however, in the character of the pulse in fever, is not difficult to be understood, by tracing the connexion of the pulse with, and its dependence upon, the brain, which may be simply *excited*, or *irritated*, or *oppressed*, according to the state and degree of its vascular action.

It is highly probable, that the greater or less disorder in the action of the heart and arteries, and consequently of the general circulation, observed in fever, depends upon the particular part of the *encephalon* affected; for there is sufficient reason to believe, that one part of the brain has a more immediate influence than

others, over the *sanguiferous system*. In the experiments of *Kaui Boerhaave**, the *vital motions* (*i. e.* the action of the heart,) in animals, continued for eight hours after the *medullary* part of the brain was reduced to a mere pulp, by violence; whereas, when the *cerebellum* was so treated, the action of the heart began to fail in a few minutes. This would lead one to suppose, that where, along with the other symptoms, the pulse is greatly deranged in fever, the *cerebellum* is, in such cases, proportionally more affected than in others.

* *Impetus faciens.*

SECT. V.

OF THE STATE OF THE BLOOD IN FEVER.

THE appearance and general condition of the *blood* in fever, are liable to be changed, no less than the state of the *blood-vessels* themselves, as above described.

For a day or two, or even longer, after the commencement of fever, the blood, when drawn from a vein, commonly exhibits none of the usual signs of existing inflammation, there are however, even then, several peculiarities, that merit notice. The *crassamentum* is exceedingly florid on its surface, from a partial but incomplete subsidence of the *red particles*, which become accumulated towards the lower part of the mass, rendering it nearly black in colour. The surface of the *coagulum* is flat and extensive, without any of the contraction or cup-like form that is observed in most other inflammations; while the texture is loose, and

easily broken. The *serum* is high-coloured, and often reddened, by the diffusion through it of a portion of the *red particles*.

Should the fever proceed in its course, the coagulation takes place more slowly, as in other inflammations, the *red particles* then subside, and the *inflammatory crust* appears. The same flatness, and extent of surface, and the same want of firmness in the *coagulum*, are observed, as above noticed; while the lymph on the top is semi-transparent and gelatinous, like *size* or melted glue; and in this, also, a portion of the red particles is often seen, unequally dispersed*.

* From some observations of Dr. Stoker, of Dublin, lately published (*Pathological Observations*, 8vo. 1823), it would seem, that the appearance of the buffy coat on the blood in inflammation is not owing simply to its slower coagulation, and the consequent subsidence of the red particles as commonly supposed; for in many instances in which the inflammatory crust appeared, the blood coagulated even more quickly than in health. The peculiar condition of the blood in fever, as above noticed, proves, indeed, that a change, beyond that of mere *tenuity*, has taken place; and which regards probably its vital, rather than its physical properties. Dr. Stoker goes so far as to imagine, that the appearance of the buff on the blood varies in each case, according to the organ affected. And he refers, in proof to the opinion of

This *want of firmness* in the crassamentum of the blood in fever, corresponds with the softness of the pulse, and the general laxity of the solids, above described; and is owing, probably, to the same general cause, namely the *oppressed* condition of the brain; for it can hardly be questioned, that the state of vitality in the system must influence the condition of the blood, as well as that of the living solids. And even when fever is complicated with another inflammation, it often impresses its own peculiar character on the blood, which seldom, in such cases, coagulates with the usual firmness.

The still greater changes induced on the vital fluid in the more *malignant* forms of fever, in which, like the living solids, the blood appears to be deprived in a great measure of its *vitality*, have been already noticed.

I have in different instances observed, how-
Mr. Todd, professor of Anatomy and Surgery in the College of Surgeons, Dublin, who asserts, that in passing through the wards of the hospital of the *House of Industry*, he could, on inspecting the cups of blood drawn in different diseases, frequently pronounce what organs were primarily or chiefly engaged in those who were bled. That this is the case in *simple fever*, I know from almost daily observation.

ever (and the same has been noticed by others *) that vibices and purple spots on the skin, and hæmorrhages of black blood, with the other signs usually attributed to *putrefaction*, have occurred, where the blood drawn from a vein has, nevertheless, exhibited a dense and even a *buffy* and contracted surface. The French chemists, Parmentier and Deyeux, examined chemically the blood of a number of persons ill of *putrid* fever, and they remarked that they never found it twice alike. Sometimes the first bleeding afforded much *buff*; at other times very little; and sometimes none at all. Sometimes the *serum* separated readily from the *crassamentum*; but oftener with difficulty. The *buff*, when analyzed, was found to be similar to that of inflammatory diseases; the *coagulum* beneath had little consistence, was very soluble in water, and the solution was coagulable by heat, alcohol, and the concentrated acids. No volatile alkali arose on distillation in a water-bath; nor was the liquor that came over at all of an alkaline

* Darwin's *Zoonomia*.—Dr. Parry; *Elem. of Pathology*.—Dr. Blackall on *Dropsies*, &c.

nature. Diseased and healthy blood were observed to take nearly the same time in becoming putrid *. If these experiments are to be relied upon, as of general application, there appears to be no foundation for the supposition that the general mass of blood, in *putrid* fever, is in a dissolved or putrescent state. It is probable that some of the diversity of appearance mentioned, may be ascribed to the fever being *simple* or *complicated*; which, as above observed, may make a considerable difference.

* *Annales de Chimie.*

SECT. VI.

OF THE STATE OF THE LYMPHATIC OR
ABSORBING SYSTEM IN FEVER.

THE state of the absorbing vessels in fever is deserving of notice, as it serves to explain some of the phenomena of the disease. It is evident from the extreme emaciation that takes place in the course of fevers of any long duration, that interstitial absorption must have been going on with much activity. Imperfect nutrition alone, could scarcely account for this, though it undoubtedly has a share in the production of the effect. At the same time, the eagerness with which fluids are sought after in fever, and, as far as one can judge, their rapid absorption from the fauces and stomach, prove that the *lacteal*, as well as the *interstitial* absorbents, are in a state of considerable excitement. This, however, appears to continue as long only as the febrile action lasts ; for as this

declines, absorption seems to become deficient ; whence the anasarca state that is so often observed to follow fevers, and that in proportion to their violence and duration.

SECT. VII.

OF THE STATE OF THE ALIMENTARY CANAL IN
FEVER.

THE state of the tongue in fever demands particular notice; for much may be gathered from an inspection of this part, not only in regard to the existence of the disease, but also its degree and danger.

As an organ of sense, I have already remarked on its affections in fever. The preternatural acuteness of the sense of taste on some occasions, its imperfections and indistinctness on others, and its occasionally vitiated state; all correspond with the altered condition of the other organs of sense, and point to the brain, as the primary seat of disease. It is, however, from an inspection of its upper surface, that we derive our chief information, in respect to the degree and danger of fever. The furred or coated state of it, simply indicates the existence of

febrile action, (*pyrexia*) and of inflammation, existing somewhere in the body, as the cause of this. But its appearance in *proper* or idiopathic fever, is marked by some peculiarities. It rarely, if ever, exhibits the whiteness that is seen in ordinary cases of inflammation, but is of different shades of colour, from the palest drab-colour, or dirty white, up to absolute blackness; the different shades of colour marking the degree and danger of the disease. In the slightest and least important cases, the fur on the tongue is of the lightest hue, while it is at the same time thinly and less extensively spread over the surface. While in the most violent and malignant forms of the disease, it is from the beginning of a brown appearance, and becomes gradually darker, thicker, and more extended, as the disease advances, till it acquires at length, perfect blackness, which extends itself to the teeth, lips, and corners of the mouth.

Should actual fever, or brain affection, arise, during the course of ordinary inflammation, it soon impresses its peculiar character on the

other disease; as is seen not only in the prostration of muscular strength, the tendency to delirium, and other signs of brain affection, but in the state and appearance of the tongue, which always becomes more or less brown, according to the danger of the case. This is what is to be understood by the expression of the disease assuming a *typhoid* form. It is a real complication of fever with another disease.

This tendency of the surface of the tongue, in proper fever, to assume a dark appearance, up to the degree of absolute blackness, is referable, I think, to the impaired vitality in the extremities of the vascular system, and corresponds with the maculæ, vibices, and hæmorrhages of black blood, and the putrescent disposition of the different secretions, already described, as occurring in the *putrid* form of fever; and, like these, serves to indicate the oppressed condition of the brain.

There are other states of tongue occasionally observed in fever, in which, instead of being thus coated, it is clean, but presents nevertheless a most unnatural appearance, resem-

bling that of raw flesh. Sometimes it is red, dry, and glazed, as if coated with a hard varnish. What such states of tongue indicate precisely, or how they are produced, I am unable to say. They all appear to be different forms and degrees of inflammation of the mucous membrane, if we may judge from the sore and often ulcerated surface which they frequently leave behind them.

The state of the *stomach* in fever merits a more particular consideration. This organ appears to be considered, by many, as the great storehouse of disease in the human body, and particularly with regard to affections of the brain. Nothing is more common than to hear of *headaches*, *vertigoes*, and even *apoplexies* and *palsies*, being referred to the stomach; as if this were the actual seat of morbid affection in these cases. It is not to be questioned, that a very close and reciprocal connexion subsists between the brain and stomach; so that the condition of the one is liable to be much influenced by that of the other. Admitting this, however, it is not warrantable to consider the stomach

as the actual seat of disease in such cases. No affection of the stomach, *per se*, could occasion such symptoms as headache or vertigo, nor constitute the immediate cause of apoplexy or palsy : all these are manifestly affections of the brain and its functions.

The proper explanation seems to be this. When a morbid condition exists in the brain or its vessels, the latter acquire an increased *irritability*, which disposes them to be thrown into violent and irregular action, from trivial causes; such as cold applied to the surface of the body, passions of the mind, violent exertion, or excesses of any kind, and none more than those in which the stomach is concerned. The disorder of the stomach in this case, like the application of cold, is a *remote* cause only of the brain affection; and, like other remote causes in general, is both uncertain, and unequal in its action: the real seat of disease in headache, vertigo, apoplexy, and the like, must be the brain, or its vessels; and in the treatment, it is necessary to keep this constantly in our view.

Diseases, no doubt, are often cured by obvi-

ating their *remote* causes, and in this way, a strict attention to the state of the stomach, from its close sympathy with the brain, is a matter of great importance in all diseases of this organ. But this alone is seldom sufficient. The other occasional causes must be equally avoided, and the diseased state of the brain itself either directly relieved, or the predisposition to irregular action in its vessels obviated. In endeavouring to effect the latter purpose, we often act through the medium of the stomach; as by giving remedies calculated to diminish morbid irritability; such as *bark*, and others usually called *tonics*; and hence a further proof seems at first to be afforded, that the stomach is the chief seat of disease; but the fallacy of this may be easily seen, from what has been already said.

With regard to the state of the stomach in fever, the functions of this organ appear, almost invariably, to be deranged at the very first attack of the disease, and to continue so throughout its whole course. *Want of appetite, loathing of food, and nausea*, ending fre-

quently in actual *vomiting*, are the never-failing concomitants of fever, in greater or less degree.

In the early stage of fever, vomiting is often one of the most distressing symptoms, and continues till the general febrile action is fully established, when it commonly ceases. And the same occurs in *hydrocephalus acutus*, the fever of infants. These symptoms are so common and striking, that many have considered the stomach to be the chief and primary seat of fever. This, however, appears improbable, for the following reasons:—

Admitting that the functions of the stomach are commonly disturbed in fever, the same is more especially true of the functions of the brain; which, as shewn above, never fail to be perverted in this disease, and that always in a degree proportioned to its violence and danger; thus shewing an essential connexion between them. The disordered state of the brain, therefore, may with less difficulty be supposed the primary cause of the disturbance observed in the functions of the stomach in fever, than the

reverse; and this, I have no doubt, is really the case.

The influence of the brain on the stomach, is discoverable in numerous instances. In most diseases of the brain that are accompanied with a febrile state of system, the appetite for food is impaired, and the power of digestion in a great measure suspended. On the other hand, in morbid affections of the brain of a *chronic* kind, and which are unattended by fever, (as in many instances of palsy, and hydro-pic effusion within the skull,) the appetite often becomes voracious, in proportion as the intellectual powers are impaired. In both cases, the affection of the stomach is preternatural, and dependent on the morbid condition of the brain.

Again, in injuries of the head from external violence, *vomiting*, as is well known, is amongst the most certain signs of the brain itself being injured. A disordered state of the stomach, therefore, is no certain proof of this organ being the primary seat of disease in any case; and still less in fever, in which so many other functions are disturbed.

This frequent affection of the stomach in fever, as well as in the other cases mentioned, it is not difficult to understand, upon physiological principles. The stomach not only receives nerves from the *great intercostal*, for the support of its *simple* or *organic* life, but also communicates directly with the brain, by means of the eighth pair of nerves, or *par vagum*. From this (the *par vagum*,) it probably derives its peculiar *sensations* and *appetites*; thus becoming, in some measure, an *organ* of *sense*, as well as of *motion* and *secretion*; and therefore, like the other *senses*, depending more immediately on the brain, and obeying its different impulses. Hence it is little to be wondered at, that the functions of the stomach in fever, like those of the other *organs of sense*, should suffer a deviation from the natural state. In this way, the uneasy sensation often felt at the pit of the stomach in fever, the total want of appetite, and the loathing and disgust commonly experienced even at the sight of food, are naturally and easily accounted for.

The dependence of the functions of the

stomach on the *nervous* power, as derived from the brain, is shewn in the experiments of tying the eighth pair of nerves in dogs; in consequence of which, they become affected with indigestion and flatulency*; and also by the effect of large doses of *opium* in these animals, which suspend almost entirely the peristaltic motion of the stomach and intestines, while the action of the heart suffers comparatively little change†.

The practical effect of looking at the subject in the light in which I have endeavoured to place it, is a point of no small importance. The considering the *sickness* and *vomiting* that take place in fever, as an indication of something requiring to be discharged from the stomach, leads in such cases to the general and indiscriminate use of *emetics*; which, if sometimes given with impunity, are yet always equivocal; and calculated, at times, to do much mischief; by disturbing, and perhaps increasing that arterial action in the brain, which is already in great excess.

* Whytt's *Works*, 4to. page 592.

† Kaau Boerhaave *Impetus Faciens*, § 434

I have often witnessed also the injurious effects of endeavouring to allay the extreme irritability of stomach that takes place in some fevers, by *opium*; the effect of which has been, to induce delirium, and aggravate the disease altogether; and that, perhaps, without even relieving the particular symptom for which it was administered. The true and only effectual remedy for the *sickness* and *vomiting*, in most of these cases, is *blood-letting*, provided it is not contra-indicated by the other circumstances of the case; which, however, it seldom is. For it is in the early stages of the disease, for the most part, and before the powers of the system are much exhausted, that such a condition of stomach is seen.

The *intestinal canal* is so variously affected in fever, as to lead to the conclusion, that this part of the system is not essentially concerned in the disease. In perhaps a majority of cases of *simple* fever, especially in the beginning, the intestines are in a torpid state; both secretion and peristaltic motion are diminished. In others, there is an excess of irritability, and

purging then takes place: while, in some, little or no change is to be observed. The occurrence of diarrhœa in fever, is generally the result of inflammation of the mucous membrane, a state that is frequently induced by the imtemperate use of purgatives, at present so much employed, and which are often, I think, carried to an injurious extent.

The paralytic state of the sphincter muscle, in the latter stage of fever, affords, in common with the involuntary discharge of urine, the strongest indication of a morbid condition of brain.

SECT. VIII.

OF THE STATE OF THE SECRETIONS AND
EXCRETIONS, IN FEVER.

THE organs of *secretion* and *excretion* commonly have their functions impaired, and sometimes suspended, in fever. Thus the secretion from the mucous membrane of the mouth and fauces is diminished, as is that from the salivary glands; whence the dry and parched state of those parts.

To the same cause may be ascribed, in part at least, the *costiveness*, which is so general an attendant of the early stage of simple fever. The *biliary* secretion is probably similarly affected, and the *skin* becomes hot and dry, from the same cause.

The secretion of *urine* in fever is almost invariably altered from the natural state; hardly any of the phenomena of fever, indeed, have attracted greater notice; and doubtless, much

useful information, with regard to the state, and probable termination of the disease, may be drawn from this source.

While the fever is on the increase, or at its height, the urine is generally scanty, transparent and high coloured, and abounds in saline matter; but when the disease begins to decline, the urine is rendered more copiously, and is commonly watery in appearance, when first discharged. As it cools, it becomes turbid, and lets fall a sediment, which is of different colours at different times; sometimes resembling *brick dust* (*lateritious*), sometimes *bran* (*furfuraceous*). The more perfect the subsidence of these matters is, the more complete is the termination of the disease.

In particular states of fever, the urinary discharge varies considerably from what is above described. In fevers occurring in weak and irritable habits, (as in what has been called *nervous fever*) the urine is often passed in large quantity, is pale in colour, and has a mucous cloud floating in it, without depositing any sediment. In those of a *putrid* kind, it is *jumen-*

tous, dark-coloured, or bloody ; a fact that is to be explained probably, on the same principle as the *ecchymoses*, and other similar appearances on the skin, before noticed.

The state of the *biliary* secretion in fever is one to which, as it appears to me, undue importance has frequently been attached. The secretion of the liver, as of other organs, is often deficient in fever ; while in many cases it is in excess, and a copious discharge of bile ensues either by vomit or by stool, or both ; such cases are commonly termed *bilious fevers* ; but seldom with propriety, if any thing *specific* is intended to be denoted by the term. In warm climates, where a disposition to affections of the liver is exceedingly strong, fever is very frequently (though not, as I believe, essentially) complicate with *hepatic* disease in different forms ; just as, in cold climates, is the case with regard to *pulmonary* affections. Such will be considered hereafter, under the head of *complicated states* of fever. In some cases, the copious discharge of bile appears to be nothing more than the result of the violent and re-

peated efforts to vomit, which will naturally have this effect under any circumstances.

Upon the whole, the disordered state of the different secretory organs in fever, is neither so constant, nor so uniform, as to warrant us in considering them as necessarily or essentially affected; or as indicating any thing with regard to the primary seat or nature of *proper* fever.

Indeed, the disorder observed in the state of these functions appears to be, the result of the general febrile action (*pyrexia*) that is going on in the system, and not of the *brain-affection* itself: for the same is observed to occur in *symptomatic fever* in general, from whatever cause it proceeds.

On reviewing the phenomena of simple *idiopathic* fever, as described above, it must, I think, be evident that the *sensorial functions*, those that belong peculiarly to the brain, are those which are primarily and essentially disturbed; not in a casual way, merely, but constantly, and in a degree proportioned to the violence and danger of the disease. Other functions are deranged in a secondary way only, and in a man-

ner that is common to various other diseases. It is in the state of the *sensorial* functions therefore, that the pathognomonic or distinctive characters of fever are to be found. So that as far as the seat of disease in any case is determinable from the state of functions, there appears the strongest reason to refer proper fever to the brain, as its primary and essential seat; while it is from the state of the functions of this organ, almost exclusively, that we form our *prognosis*, or judgment of the event. To this may be added, the feelings of the patient, which, in most cases, point to the head, as the chief seat of suffering; and which indeed the countenance sufficiently expresses; so much so, that a little familiarity with fever, will enable any one to recognize it on a first inspection.

According to the view of the subject now taken, the following may be given as a compendious statement of the natural order in which the chief phenomena of fever present themselves.

I. *Essential or pathognomonic symptoms.* Pain in the head in almost every case, at least in

the earlier stages of the disease, though afterwards often disappearing; sensorial functions, viz. *sensation, voluntary motion, and mind*, all more or less, though unequally, disturbed;—state of sleep, unnatural.

II. *Common symptoms*, or such as are observed in various other diseases. *Pyrexia*, or general febrile state of system; viz., heat of skin and of internal parts, furred state or other preternatural appearance of the tongue;—generally frequency of pulse, with other signs and effects of excited and disordered circulation.

The former class constitute what may be termed the *local* symptoms of fever, and serve to point out the actual seat of the disease; the latter, or *common* symptoms, are such as arise out of the general disorder of system, and tend to shew the intrinsic nature of the disease; as will hereafter appear. By attention to these conjointly, the existence of *simple* fever may at any time be readily discovered, so as to be distinguishable from all other diseases; and where fever is found complicated with other affections, as is not unfrequently the

case, the distinction of the one from the other will be still sufficiently easy, by observation of the symptoms that are proper to each.

The *local* symptoms, as already remarked, are in most cases manifestly seen to precede the *general* ones; and if, in any case, the reverse seems to take place, it is to be ascribed to the slight degree in which the sensorial functions are at first disordered, and the natural insensibility of the organ primarily affected; whence the little attention that is consequently paid to the actual commencement of the disease.

The *general* symptoms, as depending upon the *local* ones, are likewise commonly the first to decline or to disappear; not unfrequently, however, leaving behind them, more or less of disturbance in the sensorial functions, with perhaps, a slight degree of pyrexia or general febrile action, thereby proving, that the topical affection has not wholly subsided. And indeed in many cases, several weeks elapse before the disease has altogether disappeared, so that the patient can be said to be really convalescent.

SECT. IX.

OF THE REMOTE CAUSES, AS INDICATING THE
SEAT OF FEVER.

IF it can be shewn, that many of the acknowledged causes of idiopathic fever are such as exert their influence on the brain in an especial manner, it will furnish an additional argument in favour of the opinion here advanced, in regard to the primary and essential seat of the disease; and that such is the case will appear, I think, from an enumeration of the occasional or exciting causes generally assigned.

Dr. Cullen wished to confine the *remote* causes of fever to two sources, namely, human *effluvia* and marsh *miasmata*; the former, in his opinion, giving rise to *contagious* and *continued* fevers, the latter to those of the *intermitting* and *remitting* type. In this, I believe, he stands almost single. It has been the general opinion of practitioners in all ages, that the remote or occasional causes of fever are various

and of very different kinds; and there seems little reason to question the fact. It is, no doubt, impossible to prove that a person attacked with fever had, at no time before been exposed to animal contagion, or marsh effluvia, or something analogous to these. A person, as Dr. Fordyce observes, may have passed the opening of a common sewer, or come nearly into contact with a patient labouring under fever; or the noxious effluvia may have been brought from a distance through the air, or by other conveyances. In a great many cases, however, there is no room to suspect any thing of this kind; while the disease has so frequently followed many of the other causes assigned, and that so speedily after their application, as remarked by numerous observers, that there is little reason to question the agency of them.

The *remote* causes which have been generally assigned by writers of the best observation as producing fever, are the following: heat, cold, and especially alternations of these; intemperance of various kinds; intoxication by alcohol, or other *narcotics*; irritation of differ-

ent parts, as of the stomach from improper food, particularly food of a certain kind, as crabs and other shell-fish, which readily excite fever in some constitutions; irritation of the intestinal canal by worms, especially in children; certain passions of the mind; putrid vapours, inhaled in breathing, and putrid matter inoculated into a wound, as in dissection; marsh *miasmata*; human and animal contagion; and, perhaps, many other poisons, the source and nature of which are unknown to us.

There are other causes, also, which seem occasionally capable of exciting fever. A little girl, whirling herself round swiftly in play, became vertiginous, vomited, and complained of pain in the head, to which succeeded increased heat and thirst; these symptoms continued for the space of four and twenty hours, and then terminated in a *critical* sweat. A boy, being in perfect health at the time, went into the cellar of a brass-founder, where a quantity of charcoal was burning. He was seized at the moment of entrance with severe headache, and sickened immediately with a fever of the

typhoid form, and which continued for fourteen days.

Of some of the causes of fever mentioned above, it is difficult to assign the mode of acting; others, however, are such as are known to exert their influence chiefly on the brain and nervous system. Of this kind is *intoxication*, which when carried to a great excess, is often succeeded on the following day by headache, increased heat, and other symptoms, scarcely if at all distinguishable from fever generated from other sources. Indeed, this is one of the generally admitted causes of genuine idiopathic fever. On the other hand, the symptoms of fever so strongly, at times, imitate drunkenness, as to have been confounded with it. "There is a species of delirium," says Dr. Trotter*, "that often attends the early accession of typhus fever from contagion, that I have known to be mistaken for inebriety. Among seamen and soldiers, where habits of intoxication are common, it will sometimes require nice discernment to decide; for the

* Trotter's *Essay on Drunkenness*, 8vo. 1804. London.

vacant stare in the countenance, the look of idiotism, incoherent speech, faltering voice, and tottering walk, are so alike in both cases, that the naval and military surgeon ought at all times to be very cautious how he gives up a man to punishment under these suspicious appearances."

I have seen the secondary effects of opium mistaken for the symptoms of ordinary *typhus*. This occurred in the case of a man who made an ineffectual attempt to destroy himself by opium. On the following day, when the stupor had worn off, he was visited by a naval practitioner of great experience, who found him complaining of violent throbbing pain in the head, with flushed face, brown tongue, and a weak and frequent pulse; and, not being made acquainted with his having taken opium, the surgeon did not hesitate to say that the man was labouring under *typhus* fever, which, indeed, it was in every essential point: but as the cause was of a temporary nature, and not favoured in its action by predisposition on the part of the patient, the disease quickly subsided

again, instead of being protracted to the usual extent.

The vapours of burning charcoal produce, in most people, vertigo, headache, and throbbing of the temporal arteries; symptoms which, if aggravated and continued, and accompanied with febrile heat, would constitute the state of fever. External violence inflicted on the head, occasions very similar symptoms; viz., vertigo, and vomiting, to which true fever, not unfrequently succeeds, as we learn from the records of surgery. Dr. Drysdale, describing the fever which raged at Philadelphia in the year 1794, says, the mate of a vessel, who had been exposed to contagion, received a severe blow on the head from a cable, and was immediately attacked with the fever*.

Fear, grief, and anxiety, as they denote an affection of the *sensorium*, are by almost all writers included amongst the occasional cause of fever. Van Swieten relates the case of a girl who, when in health, being terrified at the unexpected sight of a dormouse, fell imme-

* Coxe's *Med. Museum*, No. 1. p. 33.

ately into a quartan ague, which continued to recur for a whole winter, and was brought back again, after it had ceased, by a repetition of the same cause*. Here, probably, there was a concurrence of causes, mental emotion, and marsh miasmata; to which latter, the inhabitants of Holland are constantly exposed: neither of these causes, singly, would perhaps have been adequate to the effect. On the other hand intermittents, have often yielded at once to mental emotions, after having resisted every ordinary remedy. Thus Pliny informs us, that the Roman Consul, *Quintus Fabius Maximus*, was cured of a *quartan ague* instantly on entering into battle with the *Allobroges* and *Averni*†. These facts, though far from decisive when singly taken, concur with others in shewing the connexion of fever with the state of the brain.

Inflammation on the skin may likewise be ranked among the exciting causes of fever, and probably acts upon the principle of irritation.

* Comm. § 755.

† Plinii *Hist. Nat.* lib. vii. cap. 50.

Erysipelas is thus frequently succeeded, not by general febrile action merely, but by genuine fever; when the disorder is said to *fly to the head*. This is a frequent cause of that variety of disease which is vulgarly called *brain fever*, a term that might not unaptly be applied to every proper fever, in order to distinguish it from other inflammations. The secondary fever of small-pox is probably to be explained in the same way; the quantity of inflammation on so irritable a part as the skin, which, like the other organs of sense, has a close sympathy with the brain, becomes in this case the exciting cause of the disease. It is in this way also, I apprehend, that violent external injuries, and operations in surgery, often terminate fatally; namely, by exciting fever, or a topical affection of the brain.

It would seem, therefore, that besides the specific causes of fever, namely, the different *contagions* and *miasmata*, the mode of acting of which we are ignorant of, *irritation* of various kinds, mental as well as bodily, if in sufficient degree, may become the exciting or oc-

casional cause of fever. But irritation, in order to its affecting the system generally, must operate through the medium of the brain, as the common centre of feeling, and the organ of the sympathy or consent that exists between different parts. The brain, thus irritated, will have its functions more or less disturbed from the natural and healthy state. The disturbance may be in every possible degree, and may manifest itself in different functions, depending perhaps upon predisposition, or other circumstances that we do not clearly understand. Sometimes the irritation is such as to abolish suddenly the mental and voluntary powers, giving rise to epilepsy or convulsions, as is often the case in infants: the effect here is commonly temporary, and of short duration; sometimes it produces fever simply, the affection then becoming permanent, and observing a certain progress, independent, as on other occasions, of the cause which first excited it.

SECT. X.

OF PREDISPOSITION TO FEVER, AS CONTRIBUTING
TO POINT OUT THE SEAT OF THE DISEASE.

THERE are some circumstances respecting the predisposition to fever, which seem to corroborate the idea of the brain being the chief seat of morbid affection. It has been said, that idiots, maniacs, negroes, very old people*, and likewise new born infants, are less liable to fevers than others; and that brutes† never labour under proper fever. There is, probably, some foundation for these observations, though they may not be true to the extent mentioned,

* "I have been physician," says Dr. Moseley, "to Chelsea Hospital for nearly twenty years. We have constantly in the Hospital four hundred and seventy-six pensioners; all above sixty years of age. During that period, and for twenty years preceding, there has been no popular disease, nor epidemic fever in Chelsea Hospital. Not a single instance of small-pox has occurred among the pensioners during all that time." (*Commentaries on Cow-pox*,) 1806. 76.

† It is Stahl who says that brutes are not liable to fever. (*Theor Med.*,) Sect. iii. p. 936.

they may not be true to the extent mentioned. Admitting the fact generally, it may be accounted for, perhaps, in the following manner:—

In idiots and in maniacal persons, a defective or morbid condition of the brain, and with it of the general sensibility of the system, already exists, and which, as we see, renders them insensible to a variety of impressions, both internal and external. It is not surprising, therefore, that such persons should be in a great measure insusceptible of many of the causes of fever. And with regard to negroes, the general sensibility of the body in them, is manifestly defective, while the intellectual powers, either from habit or nature, are in a considerable degree dormant; and so far the brain in them may be said to be in a state of comparative inactivity.

The weak sensibility of negroes is shewn in their want of care and anxiety, in situations and under circumstances that, to Europeans, would be productive of great mental distress;—in their hardness in resisting the inclemencies of weather, and the consequences of

drunkenness and gluttony;—in their almost total exemption from any feelings of disgust;—in their undisturbed sleep, and undiminished appetite, often though labouring under the most grievous maladies*. These circumstances all shew a comparatively defective condition of the brain or sensorium, which might be expected, even *à priori*, to render them insusceptible of the action of many causes which operate readily upon systems differently constituted.—The same reasoning applies, of course, more strongly to the case of brute animals, in which the functions of the brain are of a much less

* See Mosely and other writers on the Diseases of Tropical Climates. Negroes are said to be very deficient in *sensibility*, but to abound in *irritability*. This peculiarity of constitution keeps them free from many diseases, to which the whites are subject; but, in return, they are liable to many distempers which are seldom, or never, observed in the latter. They are incomparably more subject to convulsive and spasmodic affections, as tetanus, &c., in which respect they resemble the domestic animals in warm climates. They are subject also to an extremely malignant kind of scurvy, to boils, ulcers, and a variety of eruptions that have no name in this part of the world. It has been remarked, as a singular coincidence, that idiots and insane people among Europeans are disposed to exactly similar complaints.

complicated nature, and the organization probably more simple.

No one, however, will deny that brutes are occasionally the subjects of *contagious* diseases, which often become epidemic amongst them, and which have all the essential characters of fever. They are, nevertheless, exempt from the operation of many of the ordinary exciting causes of fever in the human subject; and hence, probably, their comparative exemption at least, from common fever.

In new-born infants, which are well known to be in a considerable degree insusceptible of the action of febrile *contagions*, the external senses are scarcely yet evolved; they neither see, hear, smell, nor taste, as at a more advanced age. When, therefore, the organs are hardly sensible to their ordinary and proper stimuli, it might be expected that they would be less subject to the influence of morbid causes, many of which, probably, act on the system through the medium of those very organs. In old age, on the other hand, the system in general becomes torpid and inirrita-

ble : hence the exciting causes of diseases, like other external agents, make but a feeble impression on the part to which they are immediately applied, while, at the same time, the brain is with difficulty roused into action by sympathy ; so that little or no general effect follows. With regard to infants, however, it will be shewn in the sequel, that although they resist the application of various *contagions*, they are yet susceptible of fever from other causes, and indeed much more so than at any other period of life.

SECT. XI.

OF THE CONSEQUENCES OF FEVER,
AS INDICATING ITS SEAT.

FEVER is apt to leave behind it a train of consequences, strongly indicative of a previous morbid state of the brain, and which, indeed, are only to be explained upon such a supposition; since similar effects are not observed to result from the affection of other organs, however violent or long continued. It is in the functions immediately depending on the brain, that the consequences alluded to are particularly seen.

The different *organs of sense* are often found impaired after fevers, and sometimes irrecoverably so. The sense of hearing is, perhaps, most frequently deranged in these cases; though impaired sight, or irregular vision, depraved sense of touch, inducing either torpor, or exquisite sensibility, with similar vitiation of the senses of taste and smell, have all been ob-

served as consequences, or *sequelæ*, of fever, and are by no means uncommon.

Paralytic affections very frequently succeed to fever; sometimes the palsy is pretty universal, sometimes of half the body, and sometimes of a single limb only, which, in the language of the vulgar, is then said to wither away, *from the fever settling in it.* *Convulsive disorders*, likewise, often follow fevers; as epilepsy, chorea, or hysteria; all of them, affections of the *voluntary power*, and, of course, shewing a morbid condition of the organ on which this faculty especially depends.

The *powers of the mind* are no less commonly impaired after fevers, and equally point out the brain as the seat of morbid affection. Hence the extreme irritability of mind, impaired memory, and sometimes complete fatuity, so often consequent on fever.

Galen (*lib. de diff. Symp.*) relates, on the authority of Thucydides, that those who recovered from the plague of Athens had forgotten every thing, even their own names. Huxham remarks of the *slow nervous fever*, that persons

who escaped the grave often degenerate into mere idiots. (*Essay on Fever*, p. 88.) Dr. Rush mentions some striking instances of mental imbecility observed during the convalescence from the fever which raged at Philadelphia, in the years 1793 and 1797. His friend, Dr. Caldwell, when recovering from the fever of the latter year, became fond of boyish amusements, such as playing with a bow and arrow; and Dr. Fisher, during his convalescence from the fever, of 1793, found the same kind of pleasure in looking over the pictures of a family Bible, that he did when a child. "However uninteresting these facts now may appear, the time will come," says Dr. Rush, "when they may probably furnish useful hints for completing the physiology and pathology of the mind:"—that they illustrate in a high degree both the seat and nature of fever, is, I think, incontrovertible.

On the other hand, fever has been found, in many instances, a remedy for other diseases originating in the brain, as palsy, epilepsy, &c., thus manifesting its influence on the state of this organ.

Enough has been said, I trust, to render it at least probable, that the brain is the chief and primary seat of fever; and that the derangement which takes place in the functions of this organ is the source of the principal phenomena, or pathognomonic symptoms, which especially characterize the disease; and, finally, that the disturbance observed in the rest of the system is, in all cases, secondary, and depends on the different excitability of different parts, and their more or less intimate connexion with, and dependence on, the sensorium. It remains to inquire into the nature of that affection of the brain which, as I suppose, constitutes the essential part of fever; or, to use the language of the schools, the *proximate cause* of the disease.

SECT. XII.

OF THE INTRINSIC NATURE OF FEVER.

No one will deny that, in fevers, the functions of the brain are greatly deranged, nor that many of the most formidable symptoms of the disease may be referred directly to this source. I have given my reasons above for believing, that the affection of the powers of *sensation*, *thought*, and *voluntary* motion, so remarkable in fevers, is not merely an accidental or casual occurrence, but essential to, and characteristic of, the disease; that it exists, in greater or less degree, in every case of idiopathic fever; while other parts of the system, that are less immediately subjected to the influence of the brain, are, by no means necessarily or constantly deranged in fever; and that, when they are so, the derangement is neither uniform in kind, nor at all proportioned to the violence and danger of the disease.

I shall next proceed to shew, that the disorder of the brain which takes place in fever, is either a state of actual inflammation, or, at least, a condition nearly allied to it, as it contains the most essential characters of this affection. This will appear alike probable, whether we consider the phenomena of the disease, the causes, or the effects of remedies; and we shall afterwards see, that the opinion derives all the support from the dissection of bodies dead of fever, that could reasonably have been expected.

SECT. XIII.

OF THE ANALOGY BETWEEN THE PHENOMENA OF
FEVER, AND THOSE OF INFLAMMATION
GENERALLY.

IF we examine the phenomena of fever by the same tests that we judge of the presence of inflammation any where in the system, we shall be struck with the great analogy which subsists between the two affections. The most striking characters of inflammation, as obvious to our senses, and to the feelings of the patient, are the following: "heat; redness; swelling; and pain, often of a pulsative kind." To these may be added increased sensibility, extending to some distance into the surrounding parts. These symptoms sufficiently characterize inflammation, as seated externally. When the disease affects internal parts, other signs must be resorted to, by the help of which we are, in most cases, enabled to detect its presence.

If, for instance, a patient complain of pain internally seated; if the pain be constant, at least without perfect intermissions; if it be attended with a sensation of heat; and especially if an unusual pulsation be felt in the part; there are strong grounds for suspecting the existence of inflammation. But if to these be added, a general increase of heat in the system, preceded by, or alternating with, rigors; heat and dryness of the skin, with thirst and foulness of the tongue; if the urine be scanty and high coloured; in a word, if the excretions in general be diminished, and the action of the heart and arteries increased, either in force or frequency; such symptoms, or even the greater part of them, shew clearly and unequivocally the presence of inflammation in some internal organ*.

In order to determine the actual *seat* of the inflammation, or the part immediately affected, we examine the situation of the pain com-

* The signs, according to Van Swieten, by which we judge of the existence of internal inflammation are, pain of a distensile kind, increased heat, and a sense of throbbing, with fever.—*Com. in Aph.*, 772.

plained of; and inquire whether the organs naturally seated thereabouts, perform their functions in a proper manner. An examination of other organs, likewise, which, though remotely situated, have yet a natural sympathy or connexion with the pained part, often assists materially in forming the diagnosis. By an attentive consideration of these different points, it is rarely that we fail to discover the actual seat of disease. To illustrate this by an example;—a person complains of pain in the back or loins. In order to determine whether the disease be a nephritic affection, or simply rheumatism, the particular seat of pain is inquired into, and the state of the urinary secretion. If still a doubt should remain, it is generally removed by attending to the state of the stomach, which, we know, is commonly affected with nausea and vomiting in diseases of the kidney, but not where the muscles of the back or their covering, is the part affected. And further, should the pain be of a continued kind; the skin of the patient hot; the tongue dry and furred; and the pulse preternaturally

quicken'd; we have every proof the case admits of, during life, that the disease is founded in inflammation.

Applying the test now mentioned to idiopathic fever, the justness of the conclusion which I have ventured to draw, will, I think, be evident. A patient labouring under fever, rarely fails to refer to the head as the chief seat of pain or uneasiness, provided his senses remain unimpaired. "He is unable to hold up his head;" or, "his head is ready to split;" are the usual modes of expression on this occasion. The pain is commonly of a throbbing kind; and the carotids, both in the temples and in the neck, are seen to pulsate strongly. The eyes are generally more or less suffused, and the whole face is redder than natural; all, circumstances pointing out an increase in the force of circulation in the vessels of the head.

That the *pain* and *throbbing* felt in the head, in a great proportion of cases of fever, depends upon actual disease, (or inflammations as I suppose it to be) going on in the brain, and not upon simple vascular excitement merely, is, I

think, clear from this consideration, that such symptoms are not produced immediately, as the first effect of intoxicating liquors, or of violent mental emotions, although these causes induce the most unequivocal marks of increased arterial action in the brain. It is only after a considerable interval, and when the first disorder of functions has subsided; and where also the irritation has been carried to such excess, or has continued so long, as to excite actual disease in the brain, as in persons unaccustomed to such powerful impressions, that the *painful throbbing* of the arteries begins to be complained of. This it is that shews the inflammatory action to have commenced in the brain, and it is soon followed by the general symptoms that denote the presence of inflammation in the system. Like many other parts, the brain, though nearly insensible in the healthy state, often feels acutely when under inflammation: hence, in such cases, every stroke of the arteries is painfully felt, and the patient is in constant dread of the bursting of the vessels.

Along with these symptoms, the whole head

is preternaturally hot, not only to the feelings of the patient himself, but when tried with the thermometer, as I have repeatedly ascertained, particularly in the fevers of children. This increase of heat in the head is often perceivable, though the rest of the body be cold. "It is very common," says Huxham, "for the face to be in a heat, while the extremities are quite cold*." I know of no instance where the reverse of this takes place in fever, that is, where the head is cold while the body is hot; the head is preternaturally hot, even while the patient is shuddering under the cold fit of an ague, and although the features of the face may appear shrunk with coldness and contraction, as I know by experience. And with regard to *continued* fever, Dr. Fordyce, remarking on the inequality of heat in different parts of the body, observes, that when the patient has felt himself universally cold, the heat, as measured by the thermometer, has frequently been found 105° un-

* Essay on Fevers, Chap. vii. "Sæpe dum caput ardet, pedes frigescunt."—Selle *Rudim. Pyretologia. cap. de febre lenta nervosa*. 8vo. p. 318.

der the tongue*. This shews an increased evolution of heat in the head, one of the most unequivocal signs of increased arterial action.

With respect to increased sensibility, which makes a part of the character of inflammation, this also belongs to fever, and is, in general, very striking in the organs of sense, which so immediately depend on the brain for the due performance of their functions. In the early stage of most fevers, the senses become exceedingly acute. Hence the impatience of light, sound, taste, and odours, which molests the sick, together with pains over the whole body. In South Carolina, as we learn from Chalmers, fevers are very frequently observed with the following characters :—" The eyes are dull and watery, as in those who are in deep affliction or despair†; and sometimes these organs are so very acutely sensible, that light, though it be not glaring nor strong, gives great pain. The organs of hearing are equally irri-

* *Dissert.* 1. p. 223.

† There is something in the appearance of the eyes, which is strongly indicative of fever, though it is not easy to define in what it consists. The dulness and suffusion of

table; for any small or unexpected noise will cause the patient to start in a fright, and breathe anxiously for some time, the pulse being then irregular and much quickened: and indeed the whole *nervous system* is now so susceptible of the smallest impressions, that whatever tastes or smells disagreeably, will excite nausea and vomiting, accelerate respiration, and cause anxiety. Only touching any part of the patient's skin, without first apprizing him of it, will much alarm him*."—The history of fever in general, at its commencement, corresponds in a great measure with the description now given.

Excessive sensibility to impression in the organs of sense, is reckoned among the most unequivocal marks of inflamed brain; and it

the eye, has been remarked by most authors. This is not surprizing, when it is considered, that, while the face and external parts of the head are chiefly supplied with vessels from the *external* carotids, the eyes receive vessels likewise from the *internal*; they thus serve in some measure to point out the state of vascular action within the head. "Oculi," says Duretus, "societatis et vicinitatis jure, præ cæteris cerebri afflictionem denotant."

* *Chalmers' Diseases of South Carolina*, 8vo. p. 170.

probably has no other origin when it occurs in fevers. It is no argument against this, that the opposite state of *torpor* is sometimes observed to pervade all the functions in fever. "In sultry weather," says the author just quoted, "towards the end of Summer, *nervous* and *putrid* fevers are apt to arise, sometimes accompanied at the beginning with somnolency, or an apoplectic state, which indicates much danger, though it may go off with the paroxysm, and its return be prevented by the bark*." These symptoms are unquestionably the effect of oppression of the brain, arising from an increased impetus of blood in and towards this organ, and therefore afford a confirmation of the doctrine here advanced. The same thing is very remarkable in hydrocephalus, where *torpor* succeeds to a previous state of great irritation: it has also been observed in *phrenitis*, and a peculiar denomination accordingly assigned to this variety of the disease, viz., *typhomania*.

There is, perhaps, no symptom which more

* *Chalmers' Diseases of South Carolina*, 8vo. p. 150.

strongly indicates an inflammatory action to be going on in the system, than a dry and furred tongue. This was well known to Baglivi, an accurate observer of the phenomena of diseases. "Great reliance," says he, "is to be placed upon the state and changes of the tongue, in the detection of diseases; other signs frequently deceive us; these seldom or never. We should be careful, therefore, never to leave a patient without inspecting the tongue, *especially if there be any suspicion of internal inflammation*, which the tongue points out with certainty; for on the least appearance of inflammation, the tongue begins to get dry, and the dryness increases in proportion as the inflammation increases*."—The application of this to fever is obvious.

* "Magna fides linguæ affectibus et mutationibus adhibenda in morborum cognitione; reliqua enim signa frequenter fallunt, hæc aut nunquam aut rarò. Cave igitur ne discedas ab ægro in cujuscunque morbi curatione, nisi prius linguam inspexeris, præsertim si de internis inflammationibus suspicio fuerit, quas tibi certissime explorabit lingua; utpote quæ in minima inflammationum suspicione, statim resiccati incipit, et crescente inflammatione, crescit pariter et siccitas linguæ."—Baglivi, *Prax. Med.*, c. 13. § 4.

The precursory symptoms are the same in fever, as in topical inflammations of other important organs. They are both frequently ushered in by *coldness* and *rigors*, to which succeed the symptoms of re-action, as they are termed, heat, thirst, dry and foul tongue, accelerated pulse, and suppression of excretions—symptoms, which ordinarily accompany inflammation, whatever be its seat, provided the heart and general vascular system sympathize with it; an effect that takes place much sooner when certain organs are inflamed than others, and which also depends much upon the previous state of the patient, in regard to strength and irritability.

The accession of fever is often preceded by an unusual feeling of health and sprightliness. It was remarked of a certain patient, of naturally a sluggish understanding, that on the attack of a febrile disorder, his conceptions were raised in a manner far above what was customary to him in health.—Van Swieten mentions a similar fact. “Vidi et ingenii acu-

* *Com. in Aph.*, 560.

men auctum in singulis paroxysmis febris intermittentis*.” These circumstances, trivial as they may seem, furnish an indirect proof of the nature of the disease. The first and slightest degree of inflammatory action heightens the sensibility of an organ, and enables it to perform its functions with augmented vigour: this is the natural effect of that excited vascular action, which makes an essential part of the character of all inflammations. It is only in the further progress of the disease, when the part becomes oppressed and suffocated, as it were, by the violent action of its vessels, and the consequent effusion into its substance, obstructing and impeding the proper action of the individual component parts of the organ, that the functions become impaired, or wholly obliterated.

* *Com. in Aph.* 560.

SECT. XIV.

OF THE STATE OF THE BLOOD IN FEVER,
AND IN INFLAMMATION.

It has been already remarked, that, similar to what usually takes place in other inflammations, the blood, in most fevers, shews, when drawn, the *inflammatory crust* or *buff* on its surface. This appearance is not peculiar to any one form of the disease, but is occasionally observed in fevers of widely different characters. In what are called *inflammatory* fevers, and in *vernal intermittents*, it is a very frequent occurrence. It has been often observed, likewise, in *malignant* fevers at their commencement; and even in the *plague* itself*; in those fevers, for instance, where, towards the end of the disease, the *crasis* of the fluids appears broken down, and a great tendency to putrescency comes on.

* *Frank de Curat. Morb. Hum.*, tom. I. 185; and *Sydenham de Morb. Acut.*, sect. 2. cap. 2.

The absence of the *inflammatory crust* on the blood, in many cases of fever, is easily accounted for, and affords no argument against the existence of inflammation in this disease; for the same thing occurs occasionally in other inflammations.

The manner in which the change in the condition of the blood, observed in inflammation, is brought about, is by no means clearly understood. It appears, however, to be rather the result of the general excitement that takes place in the vascular system, (the *pyrexia* or febrile state,) than directly of the inflammation itself. Hence, as inflammation may exist without inducing *pyrexia*, the absence of the inflammatory crust is no proof that inflammation is not present. And thus it is, that the blood first drawn in cases of inflammation often presents no such appearance; while, in subsequent bleedings, when the febrile symptoms are established, it is strongly marked. This, I think, is more particularly the case in idiopathic fever, and may perhaps be accounted for by the altered state of action in the arterial coats, evinced by

the softness of pulse, alluded to in a former section, as peculiarly characterizing *simple* fever. I have frequently observed the two or three first bleedings in fever, to be without the least appearance of the *inflammatory crust*; while the succeeding ones have shewn it in a striking degree; and that where the fever has preserved its simple character throughout, without the occurrence of any secondary inflammation to produce it.

It may be said, that a buffy appearance of the blood occurs in pregnancy, and perhaps in other cases, where no inflammation is suspected; and therefore, that such an appearance in fever is insufficient to connect this disease with inflammation. Admitting this, it does not destroy the analogy between the two affections; for this is one only of many striking points of resemblance between them.

SECT. XV.

OF THE EXCITING CAUSES OF FEVER,
AS COMPARED WITH THOSE OF ORDINARY
INFLAMMATION.

MANY of the acknowledged causes of fever, while they manifestly affect the brain, are the same in nature with those that produce inflammation in general. Such are, *mechanical injuries* of the brain; the influence of *intense heat* on the head, as from exposure to the sun's rays; and what is called *taking cold*; which last is followed by inflammation in one organ or another, according to the previous disposition to disease in particular parts; in one, it produces *catarrh*; in another, *rheumatism*; and in some, *idiopathic fever*. The operation of many of the other causes of fever is less obvious, and less easily understood, though the disease itself, in all the cases, is marked by all the essential characters of inflammation in the brain.

Whatever increases *inordinately* the vascular action of a part, may become a cause of inflammation. Thus heat and friction, moderately applied, increase the natural actions; but, carried to excess, produce inflammation. So it is with regard to many of the causes of fever. *Mental emotions, strong sensation* of all kinds, and great *muscular exertion*, all of which are seen to increase the arterial action of the brain, (or, as it is more commonly, though erroneously, expressed, increase the determination of blood to the brain,) are among the generally admitted causes of *idiopathic* fever; as they are, at times, of that other variety of inflammation of the brain that is termed *phrenitis*.

The operation of the *specific* causes of fever, namely, the different *contagions, marsh miasmata, putrid effluvia*, and the like, is too obscure to justify our entering much into detail. Whether they act *primarily* on the nervous expansions to which they are immediately applied, and *subsequently* on the brain, by *sympathy* merely; or whether they are taken into the system by absorption, and carried formally to

the brain, thus producing their effect by direct application to the organ—has long been, as it still is, a subject of dispute and uncertainty. One sees no absolute necessity for the supposition of such matters being absorbed, in order to their producing their effect on the brain; as it is certain, that the condition of the brain may be very powerfully and suddenly influenced, by applications to remote parts of the body. Thus *fainting*, or a total loss of sense, is often instantaneously induced by the action of certain odours and effluvia on the organ of smell; while it may be as suddenly again removed, by applications of a different kind.

Alcohol and *opium*, but especially the *prussic acid*, kill almost instantaneously, when taken into the stomach in large quantities; and the bites of certain venomous reptiles prove fatal, almost as soon as inflicted. *Opium* destroys the energy of the brain, inducing general paralysis, by being thrown into the cavity of the abdomen in frogs, nearly as soon when the heart is removed, as when the animal is entire*.

* See the experiments of Whytt, Monro, and others.

The effect in this case must be produced through the intervention of nerves.

The surfaces on which the nerves of the organs of sense are expanded, are more especially susceptible of external impressions, and, when stimulated, more powerfully influence the state of the brain, than other parts that are less plentifully furnished with nerves. It appears from the experiments of Dr. Black, that carbonic acid gas kills more speedily if inhaled through the nostrils, than if taken immediately into the lungs through the mouth only. "I discovered," he says, "that this particular kind of air, attracted by alkaline substances, is deadly to all animals that breathe it by the mouth and nostrils together; but if the nostrils were kept shut, I was led to think that it might be breathed with safety. I found, for example, that when sparrows died in it in ten or twelve seconds, they would live in it three or four minutes, when the nostrils were shut by melted suet." This seems to shew, that the *olfactory* nerves are more susceptible of impression, than those distributed on the surface of the bronchia

and lungs ; and this is what, indeed, might have been expected to take place, considering the abundance of nerves with which all the organs of sense are supplied, and their proximity to, and immediate dependence on, the brain.

In other cases, the inhalation of *carbonic acid gas*, and of various *noxious effluvia*, produces instant headache in many persons, attended with a violent throbbing of the arteries of the head. "A phrenzy or delirium," says Dr. Lind, "is often the first and immediate effect of a bad air^{*}. Some of the *gases*, when inspired in a highly-concentrated state, kill almost instantaneously, before they could possibly have found their way into the general circulation. And it has been often observed, when the *plague* has been raging with great violence, that persons exposed to the contagion have dropped down suddenly, as if struck by lightening, and have died in a short time[†].

^{*} Lind on Hot Climates, p. 176.

[†] Primis mensibus quibus grassabatur pestis, nullo fere non die ejus contagio afflati, dum in triviis versarentur, inopinantes extincti sunt, nihil prorsus mali præsentientes."—Sydenham *de Morb. Acut.*, sect. 4 cap. 3.

These instances sufficiently prove, that different *noxious effluvia* can exert their full action on the system, without being taken into the mass of blood; there is no necessity, therefore, for supposing *infectious miasmata* to be absorbed. They may act on the brain through the medium of the mouth, nostrils, lungs, stomach or skin, with all of which they must come in contact. Whether they actually do so in all cases, or in any, or whether they are in some instances absorbed, and carried into the system, it is difficult to determine; but in either case, their action is probably exerted on the sentient extremities of nerves; in the latter case, on those distributed on the internal coats of the blood-vessels; in the former, on those of the general surface of the body, or of the cavities which open externally.

In the application of certain infectious matters to the body, as of the *variolous* or *syphilitic virus*, we are apt to imagine that we can trace the progress of the poison into the system, step by step. First, no effect is perceived for several days: then the punctured part becomes in-

flamed, and the inflammation can be often traced along the course of the absorbent vessels to the next lymphatic gland, which itself becomes enlarged and painful, as if acted upon by the presence of a foreign stimulus; and, after all this, follows the constitutional affection. Hence we are accustomed to consider the absorption of the poison, in these cases, as almost a matter of demonstration. This conclusion, however, upon attentive consideration will scarcely be found to be warranted.

In the first place, the same phenomena sometimes present themselves where no peculiar matter has been applied; as when the skin is punctured by a thorn, or a clean polished instrument, as a needle or the like. The induration of the lymphatics, and of the gland above, can only be ascribed in this case to the communication of inflammation through a series of parts of similar organization and function; circumstances which we know, from general observation, to be the foundation of an intimate sympathy between different and distant parts.

In the next place, upon the principle of ab-

sorption, it is difficult to account for the poison lying so long a time in the part to which it is at first applied ; and for this time being so unequal with regard to different poisons :—a fresh wound is known to be a good absorbing surface with regard to other applications. Nor does the idea of absorption at all enable us to understand various other circumstances attending infection. It does not explain the strongly-marked difference between the casual and inoculated small-pox ; nor the limited action of the variolous and other poisons in the system. If absorption of these poisons were necessary to their action, the general diffusion which they must necessarily undergo, might be expected to produce a more general effect than is actually observed. *Quantity*, likewise, might be supposed to influence the event ; which, however, does not seem to be the case.

What has been just stated I do not by any means consider as proving incontestibly that *contagious* matters are not absorbed, previous to their acting on the general system ; it only serves to shew that the contrary has been as-

sumed, rather than demonstrated; and therefore, that we ought to be cautious in employing it as a basis of future reasoning, particularly in regard to the treatment of diseases.

It may be observed in addition, that the *specific* causes of fever, all shew a tendency to excite inflammation, though in different parts, and perhaps of different natures; as is seen in the *plague, small-pox, measles, scarlatina, influenza*, and others; whence there is little difficulty in conceiving, that they may produce such a condition of the brain itself: of which there are indeed the strongest signs.

SECT. XVI.

OF OTHER POINTS OF RESEMBLANCE BETWEEN
FEVER, AND INFLAMMATION.

IN the manner of attack, the general course of the disease, and its termination, *idiopathic* fever bears a striking resemblance to inflammation in general. Many fevers come on gradually, and almost imperceptibly; several days often elapsing, before the disease is fully formed, or even noticed; while, on other occasions, the attack is sudden and violent: in which case it is generally introduced by *rigors*, or a *cold fit* of more or less severity, and which is quickly followed by as severe a hot one; and this again by sweating. It can hardly be necessary to remark, how strikingly, in all these respects, *idiopathic* fever resembles other inflammations. The only real difference between them is, in fact, in regard to the topical affection; the seat of which, in ordinary inflammation, is, in general, readily ascertained by the pain and dis-

turbed state of functions in the part primarily affected. If the same is not always equally evident in the attack of genuine or idiopathic fever, it is to be ascribed to the circumstances before alluded to, namely, the natural insensibility of the brain, in the first place, in consequence of which, but little local pain is often complained of; secondly, to the more general disturbance and uneasiness excited throughout the system, from the universal influence which the brain exerts over the body; whence the *secondary* symptoms often attract the chief attention of the patient or practitioner, while the *primary* and essential? are overlooked;—and lastly, to the confused state of intellect, which is so apt to accompany brain-affections, rendering the patient incapable of describing distinctly and accurately what he feels.

The natural course and termination of fever and of inflammation are, in most respects, alike. Both make their attack with similar symptoms, as before observed; proceed with gradually increasing severity to their height: and then as gradually decline; or else they terminate more

abruptly, by a *critical* sweat, or other evacuation. During their progress, the general disorder of system (the *pyrexia*) is so nearly the same in the two cases, that the one is easily mistaken for the other. The heat of skin, the frequency of pulse, and the furred tongue, are common to both; and it is not till a more minute inquiry has been made into the feelings of the patient and the state of the different functions, that the organ primarily affected can be ascertained.

Fever is frequently observed to alternate with inflammation; and as one inflammation often ceases upon the accession of another, so fever and inflammation, in many cases, prove reciprocally a remedy for each other. Thus, in *erysipelas*, and various other inflammations, *metastasis*, as it is called, not unfrequently takes place to the brain, and idiopathic fever ensues, the original inflammation often subsiding; while, on the other hand, fever sometimes is terminated *critically*, in consequence of inflammation arising in some external part.

Fever and inflammation agree, also, in this

respect, that, when once excited, they both go on in a great measure independent of the cause which first produced them, and continue their progress according to certain laws of the animal economy, with similar tendencies to terminate at certain periods, rather than at others. This tendency to run a determined course has been observed with regard to inflammations occurring in warm climates, as in Greece and Italy, as noticed by the oldest and best observers; while, in cold climates, neither fever nor inflammation appears to be governed by such regular laws. Or it may be, that the more active remedies in use in modern practice, by disturbing the course of the disease, may render us less capable of judging of its spontaneous, and natural termination.

SECT. XVII.

OF THE ANALOGY BETWEEN FEVER AND INFLAMMATION, IN REGARD TO THE CURE GENERALLY.

It is a remark as old as Hippocrates, that the nature of a disease may be known in a great degree from the remedies which are found to cure it. Not only are the general course and termination of fever and of inflammation similar, but the artificial means of cure, also, are in great measure the same. Much is usually done in the treatment of fever, that is trifling and superfluous; but, with regard to the really effective means of cure, there is no essential difference.

Thus, *blood-letting, vomiting, sweating, purging, and blistering*, are the principal remedies that have been employed with effect, to carry off both fever and inflammation. In both cases, if employed early in the disease, and to the necessary extent, they have, in numberless instances, cut short their progress; while, if later

had recourse to, their power, both in fever and inflammation, is uncertain, and their use sometimes hurtful. In these respects, there is the most perfect agreement between the two diseases. On the other hand, it is sometimes necessary to increase the violence of an inflammation, by stimulating remedies, in order the sooner to effect a cure; a practice that is no less applicable in fever, which is often brought to a *crisis* by remedies of a stimulating kind*.

The *cold affusion*, which, à few years ago, was used with much success, in arresting the progress of fevers in their early stages, there is great reason to believe, is no less capable of cutting short many topical inflammations. In *ileus*, an affection that often probably depends upon inflammation of the intestines, the sudden affusion of cold water, or standing on a cold and damp floor, has very quickly produced a solution of the disease. The same remedy has often cured suppression of urine, that appeared to

* Est circumspecti quoque hominis, et novare interdum, et augere morbum, et febres accendere; quia curationem, ubi id quod est, non recipit, potest recipere id quod futurum est."—*Cels. lib. 3. c. 10.*

depend on an inflamed state of the kidneys. And we have even instances of pulmonic inflammation being cured by similar means.

Dr. Smollet mentions, in his *Travels*, his having made an experiment of this kind upon himself with success. “In consequence of a *cold* caught in France,” he says, “I was seized with a violent cough, attended with fever and stitches in my breast, which tormented me all night long, without ceasing; at the same time I had a great discharge by expectoration, and such a dejection of spirits as I never felt before. In this situation, I took a step which may appear to have been dangerous: I knew there was no imposthume in my lungs, and I *supposed the stitches were spasmodical*: I was sensible that all my complaints were originally derived from relaxation; I therefore hired a chaise, and going to the beach, about a league from the town, plunged into the sea without hesitation. By this desperate remedy, I got a fresh cold in my head, but my fever and stitches vanished the very first day; and, by a daily repetition of the bath, I have diminished my cough, strengthened

my body, and recovered my spirits.”—Notwithstanding the Doctor’s opinion of the stitches being *spasmodical*, and derived from *relaxation*, few at present, probably, will hesitate to consider the case as an instance of pulmonic inflammation, cured by early recourse to the *cola bath*. The following, which is still more in point, serves to shew the benefit derivable from the continued application of cold, as a remedy for inflammation :—

Dr. (now, Sir Gilbert) Blane, author of the *Treatise on Diseases of Seamen*, in a paper giving an account of a remarkable hurricane which occurred at Barbadoes in the month of October 1780, and published in the *Transactions of the Royal Society of Edinburgh*, Vol. I., observes, “that it had a visible good effect on the diseases of the climate, fevers and fluxes. Chronic diarrhoeas, the consequence of dysenteries, were also cured by it. But the diseases on which it operated most visibly and sensibly, were *pulmonic complaints*. Some recent cases of phthisis, and even the acute state of pleurisy, were cured by it. Nay, in the more ad-

vanced and incurable state of phthisis, the hectic fever was in a great measure removed, and a temporary alleviation at least procured." He mentions particularly the case of a lady of his acquaintance, who was ill of a pleurisy at the time of the hurricane, and passed more than ten hours in the open air, sitting generally in a splash of water from the rain that fell; she felt afterwards no more of her complaint, nor had any return of it.

Blood-letting is, perhaps, the most powerful and generally applicable remedy for inflammation that we are in possession of: and I believe it will turn out to be so with regard to fever also: yet there are, in both cases, numerous exceptions to its use. In some varieties of inflammation, and in certain states of the system, it is well known that *blood-letting* cannot be employed with advantage, but is superseded by remedies of even an opposite character. So it is, also, with regard to fever: the disease has been cured in innumerable instances by loss of blood, both artificial and spontaneous; whilst in many of its varieties, such treatment appears

to be inadmissible. This subject will be further considered hereafter.

Opium, as a remedy, appears to be subject to the same restrictions in the cure of both inflammation and fever. When the *phlogistic diathesis*, (which may be defined, an accelerated, and more violent action of the heart and arteries in a strong habit) accompanies either fever or inflammation, *opium* is at best a doubtful remedy, and is often manifestly injurious. In the opposite circumstances, where, for example, the strength of the patient has been reduced by previous evacuations, or protracted disease, *opium* deservedly ranks with the most useful remedies, both in fever and in inflammation. To this it may be added, that when the disease recurs by paroxysms, which happens in many inflammations as well as in fevers, the recurrence is frequently put a stop to, by *bark*, and other remedies of the same class.

In short, in whatever light we view the subject, we cannot but be struck with the great similarity that obtains between inflammation and fever. Inflammation, like fever, is seldom

stationary, but is generally either increasing or diminishing. It has its periods of accession, and of increase; its acme, and its decline. It may, like fever, terminate quickly by sweating, hæmorrhage, or other critical evacuation; or it may go off gradually. It may be cured by blood-letting, but under the same restrictions that determine the propriety of this evacuation in fever. The general regimen is the same, in both diseases, and consists chiefly in avoiding all unnecessary irritation. The best palliative remedies during their course, are such as excite a moisture on the skin, and keep the bowels free from accumulation. *Opium*, in inflammation, as in fever, is generally improper in the height of the disease, but advantageous in the decline. *Blisters*, and other topical applications, oftener relieve, than at once remove the disease, whether fever or inflammation.—In all these respects, the analogy between them is close and satisfactory.

On the other hand, the differences that are observed between fever and ordinary cases of inflammation, may be readily explained, by the

diversity of structure and of function in different parts, and the different laws to which they are, in consequence, subjected. The difference, in fact, is not greater than is found to occur between one inflammation and another, as varied by seat, cause, and individual constitution. We observe one part, when inflamed, running rapidly to disorganization, or death; another, readily suppurating; a third, continuing in the inflamed state, with little change, for a considerable length of time. One part, when inflamed, deranges the general functions of the system by sympathy; while another is strictly local in its effects. Sometimes the *inflammatory diathesis* takes place, characterized by a full, strong, and tense pulse; at another, general irritation of a different kind, with a pulse contracted, hard, and feeble. Equal varieties in the state of the disorder of the general system are produced, even by the same organ, according as the inflammation is seated in particular parts of it; as might be instanced in the lungs, the liver, &c. In short, when we reflect, that inflammation of the brain, like that of other

organs, may vary in regard to its particular seat, extent, degree, and termination; in regard to the constitution in which it arises; and doubtless, also, according to the nature of the cause inducing it, as *specific* or otherwise; we see an ample and sufficient source, of all the varieties that are ever observed to take place in fever; as will appear more clearly hereafter, when we come to treat of them in detail.

SECT. XVIII.

OF PREDISPOSITION TO FEVER, AS INDICATING
THE NATURE OF THE DISEASE.

MANY circumstances attending the *predisposition* to fever seem to shew, that it partakes of the nature of inflammation.

Some persons are more disposed to fever than others, just as is observed with regard to other inflammations. I have known instances of persons who have had regularly, for several years in succession, an attack of *inflammatory* fever in the Spring, unaccompanied by any topical inflammation (unless in the brain), and which commonly terminated within eight days, by the use of moderate *blood-letting*, and the common antiphlogistic regimen.

The predisposition to fever, of different kinds, appears to be stronger in persons of vigorous habits, and who live intemperately and luxuriously, than in those of an opposite de-

scription. The disease in such, too, is commonly more acute and dangerous, and more quickly terminates fatally.

This, though undoubtedly true with regard to *violent* or *malignant fever*, is contrary to the prevailing opinion in respect to that milder form of fever, so common at present, and which has been unmeaningly denominated *typhus*, as if it possessed a peculiar or *specific* character. This form of fever is generally supposed to attack, in preference, the feeble and debilitated, and to be of more difficult cure in such. As a general rule, this opinion is not, as far as my own observation goes, well founded; and it is controverted, likewise, by the experience of some of the best writers on the subject. One obvious source of fallacy, may here be mentioned; which is, that women, and others of delicate constitutions, are from their more frequent employment in domestic offices, necessarily more exposed to infection than others, and so may seem more liable to be attacked by fever. Infirm people are, indeed,

often observed to be prone to disease *;—not, I think, to diseases generally or indiscriminately, but to disease of some particular organ, different in different individuals, and which, from original structure or acquired disposition, is preternaturally *irritable*, and consequently disposed to be thrown into irregular action from trivial causes. Thus, some have tender lungs, others irritable bowels, &c.; and it is not unlikely that an equally irritable state of brain may exist in many infirm people, rendering them in a peculiar manner subject to the attack of fever. But in general it has appeared to me, that men are at least as susceptible of *low fever* as women, if equally exposed to *infection*, or other causes, and that the disease in them is more violent, and attended with greater danger.

On the other hand, temperance, and even strict abstinence with regard to the usual modes of living, have, in numberless instances in times of *pestilence* and *contagion*, proved sovereign preservatives; and, when the pre-

* “Omnibus morbis obnoxia maxime infirmitas est.”—*Cels.*, lib. i, c. 3.

vailing disease has occurred under such circumstances, it has been rendered comparatively mild and safe. In hot climates, negroes, women, water-drinkers, and others who observe great temperance of living, are far less subject to be attacked by the *endemic* fever of the country, than those in the reverse circumstances. The Frenchman, who lives much on vegetables, and drinks sparingly of strong liquors, escapes much better the ravages of the yellow fever, than the Englishman, who eats, and drinks as he had been accustomed to do in northern regions. Timoni, in his account of the *plague* at Constantinople, observes, that the Armenians, who live chiefly on vegetable food, were far less disposed to the disease than other people*. M. Desgenettes observes, with regard to the *plague* or *pestilential fever* in Egypt, that women, young persons, and infants at the breast, escaped *infection* more than the most robust men †. Of the *plague* at Moscow, De Mertens

* “ Armeni omnium nationum minimè ad pestem sunt dispositi; observo illos paucissimis uti carnibus: cepis porris alliis, vinoque maxime utuntur.

† *Histoire Med. de l' Armee de l' Orient.* p. 108.

observes, "that the young and robust were more liable to become infected, than elderly and infirm persons: pregnant women and nurses, were not secure from its attacks. Children under four years of age were much less readily infected, but, when they were, they exhibited the worst symptoms."

"Almost all the first victims of the yellow fever," says Dr. Drysdale, "were persons habituated to the immoderate use of ardent spirits, and it is a melancholy truth, that very few of these unfortunate creatures could be rescued from death by all the powers of medicine."—"In drinkers of ardent spirits, the fever was excited not only with more facility, but was attended also with almost irresistible violence and malignity. Even a moderate but unusual indulgence in these liquids, soon roused the disease into action. A glass of wine would occasion a headache in those who were much exposed to the exhalations of the sick, or to the air of *infected* places; and for a considerable time in September, half that quantity would affect me in a similar manner*."—It is scarcely

* See Coxe's *Med. Museum*, No. 1. p 30.

necessary to remark on the tendency of *spirituous* liquors to occasion increased vascular action in the brain: and we see readily, upon the hypothesis here contended for, a reason why the use of them should both give a *prediposition* to fever, and aggravate all its symptoms, at least during the most active stages of the disease.

I have invariably observed fever in this country, to assume an unfavourable character in notorious dram-drinkers, and very frequently in such to prove fatal.

SECT. XIX.

OF FEVER AS COMPARED WITH THE PHRENITIS
OF AUTHORS.

FROM what has now been said, it must appear, I think, at least probable, that fever consists *essentially* in an inflammatory action going on in the vessels of the brain; in other words, that it is neither more nor less than a species of *phrenitis*, or topical inflammation of this organ. This will appear still more evident from a comparison of the symptoms, causes, and treatment of the two affections.

The term *phrenitis* has been so vaguely used by writers, that it is not always easy to ascertain the sense in which they employ it. In some of the works ascribed to Hippocrates, it obviously denotes more than a mere symptom, and is spoken of as a primary affection, distinct from delirium—"vehementi *insania* detenti, tremuli, cum crebra sputatione, metus est ne

phrenetici evadant *”—here the term appears to be employed in nearly the same sense that we use it at present, namely, to denote an acute topical affection of the brain, though it is not directly ascribed to inflammation.

Some even of the moderns have considered *phrenitis* as an affection of the brain, distinct from inflammation. Willis thought it depended upon a *phlogosis*, or inflammation of the *animal spirits*, not of the substance of the *brain*, the inflammation of which, he supposes, would be more likely to occasion soporose diseases †. Selle, in his *Rudimenta Pyretologiæ*, places *phrenitis* among the *Atactæ*, or nervous disorders, and considers it as existing without inflammation, as proved, he says, by dissection, and by the opinion of Hippocrates. In general, however, modern writers agree in considering *phrenitis* as a topical inflammation of the brain or its membranes, and it is in this sense that I shall here employ it.

Phrenitis has by some authors been divided

* *Coacæ Prænotiones*, sect. 2.

† *De Delirio*, cap. x.

into two species, the *true* (*phrenitis vera*) and the spurious; or the *idiopathic* and *sympathetic* species; the latter is universally allowed to accompany fever in numerous instances. The distinction here made is of little importance, in regard to the nature of the disease; for whether it occurs as a *primary* affection, or comes on *secondarily* in the course of other diseases, it is still inflammation, and in both cases entitled to the denomination of *true* phrenitis: there is no difference, except as to the preceding state; the seat of disease is the same in both. Alexander Trallianus * distinguishes the *phrenitis vera* from the *symptomatic* species, by saying, that in the former the head is hotter than natural; but in all fevers there is preternatural heat of the head.

Sauvages has made a two-fold division of inflammation of the brain; the *membranous*, having its seat in the membranes, and to which exclusively he applies the term *phrenitis*; and the *parenchymatous*, affecting the substance of the brain, and which he calls *cephalitis*. Simi-

* Lib. 1, c. 13.

lar distinctions have been made by other nosologists * ; but Dr. Cullen observes, that there are no symptoms which serve to characterize one or the other of these exclusively ; nor has dissection established any such distinction : he therefore considers *phrenitis*, *cephalitis*, *phrenismus* and *sphacelismus*, as synonymous, or as merely varieties of the same affection, not possible to be discriminated in practice †.

Upon this I would remark, that although it may not be at all times possible in practice, to distinguish inflammation of the membranes of the brain, from the same disease affecting the cerebral substance, such a distinction nevertheless really exists ; and, if it does, that it will be discoverable by symptoms, can hardly be questioned, with any regard to physiology. An affection of the membranes *exclusively*, can have no

* Linnæus calls the inflammation of the substance of the brain, *sphacelismus*.

† “Symptomata nulla dantur quæ semper phlegmasiam cerebri a phlegmasia membranarum ejus, sive meningum, certò distinguere possint : neque sectiones cadaverum distinctiones adhibitas confirmant.”—Cullen *Syn. Nos.* tom. ii, G. ix.

power to produce disturbance in the functions of the brain ; this can only arise from an affection of the cerebral substance itself. Undoubtedly, inflammation of membranes, may, by contiguity of parts, and continuity of vessels, be a source of irritation to the brain, and thus, in some degree, disorder its functions, without the existence of actual inflammation, and this is the more easy to be believed, when we reflect that the brain may have its functions disturbed by irritation of distant parts, as of the stomach and bowels, of the gums in teething, and of the uterus in pregnancy. In many, perhaps in most cases, the two affections in inflammation of the membranes, and of the substance of the brain, co-exist ; the symptoms then become blended together, and yet may admit of discrimination. It would not be difficult, even *à priori* and from analogy, to assign the characters of membranous inflammation of the brain, as existing separately, and as distinct from inflammation of the cerebral substance.

Instances of this, I think, are not uncommon in children, in whom the disease is character-

ized by few and simple symptoms, such as pain and heat of the head, flushing of the face, and a quick and frequent pulse, with other general febrile symptoms; such altogether as are found to attend membranous inflammation in general, without any material disorder of functions, or, at most, an irritated state of them.

Such cases, if slight, may continue for a considerable time, and gradually end in serous accumulation, giving rise then to a new train of symptoms, which have been called altogether *hydrocephalus*. In the more acute cases, the inflammation spreads into the cerebral substance, (if it should not in fact, have begun there,) and then it is, that the *sensorial* disturbance is perceived. Simple inflammation of the membranes of the brain does not therefore, produce *phrenitis*, which, in the ordinary acceptance of the term, is characterized by great disturbance in one at least of the *sensorial* functions. This disease is an inflammation of the brain itself; not general, because then there would be a disturbance of all the *sensorial* functions; but partial, and confined to that parti-

cular part of the organ which is connected with *mind*, whatever that may be, a point which we can scarcely yet venture to decide upon.

On the other hand, inflammation of the *cerebral substance*, will, of necessity, disturb the functions of the organ, and that in a degree and manner proportioned to its violence, and extent, and particular situation ; all of which must occasion some diversity of symptoms. There is no reason for supposing, with Willis, that inflammation of the substance of the brain, should always occasion soporose diseases. It will depend upon the particular seat of the inflammation, its degree and extent, and also the influence which the inflamed and tumefied part may have upon the surrounding parts, what will be ~~the~~ particular characters of the individual case ; and thus a foundation is laid for the utmost possible diversity of symptoms ; there are, in fact, no two cases in all respects alike. And thus it is, that every case of *idiopathic fever*, is marked by shades of difference that distinguish it from others, though

arising from the same cause, and under apparently similar circumstances.

The definition of *phrenitis*, given by Dr. Cullen, in his *Nosology*, is contained in few words:—"Pyrexia vehemens; dolor capitis; rubor faciei et oculorum; lucis et soni intolerantia; pervigilium; delirium ferox; vel typhomania."—If these characters are necessary to constitute *phrenitis*, it must be exceedingly easy to distinguish it in practice, both from *fever* and from other affections. But it is manifest from the history of diseases, and from the concessions of Dr. Cullen himself, that the symptoms above-mentioned are not essential to *phrenitis*, or inflammation of the brain; for this disease may be present although they are chiefly wanting, as proved by dissection. Such symptoms denote only a particular variety of the disease, and are therefore not properly given as characteristic of the *genus*.

Willis observes, that he has often seen the *meninges*, and sometimes the *cortical* part itself of the brain, inflamed ("tumore phlegmonòde obsessas"), where the patients experienced

none of the symptoms of *phrenitis*, not even delirium, but died with those of torpor, and *carus* only* ; which he ascribes to compression of the medullary substance, by the inflamed and tumefied parts. Similar symptoms are often observed in the worst form of fever, the patient lying from the first in a state of stupor and insensibility, with few, if any, febrile symptoms.

Fontanus relates a case of *phrenitis*, or inflammation of the brain, in which the symptoms were merely such as are observed every day in cases of *malignant* fever, “*arteriam in carpo contemplor duram, cum pulsu frequenti et exiguo: ægrum imaginatione laborare deprehendo, continuo delirantem, floccos carpentem, insomnem, immorigerum ; cui lingua exusta, fuliginosa, nigra ; excrementa sicca, dura, pilularum instar : hunc phrenitide laborare confirmata, eaque exitiali, mihi persuasi : nam triduo post, nullis auxiliis aptis proficientibus, migravit e vivis. Secto capite, contemplatoque cerebro, in ejus medullari substantia repertus est tumor*

* Willis, *De Anima Brutorum*, p. ii, cap. x.

nucis juglandis magnitudinis, rubidus et venis turgentibus sanguine repletis, qui hujus noxæ causa fuit certissima: rupto abscessu, emanabat foetidus ichor, cochlearis quantitate*.”

Dr. Cullen, at the same time that he defined *phrenitis* in the way above-mentioned, was fully aware of the ambiguity of those symptoms, and of their being often wanting. “Rectè monet Vogelius,” he says, “signa *phrenitidis*, vel ut vocat *phrenismi*, hoc est, inflammationis cerebri aut membranarum ejus, admodum ambigua esse †:” and he himself observes elsewhere, “that an *idiopathic* phrenzy is a rare occurrence, a *sympathetic* more frequent; and the ascertaining either the one or the other is, upon many occasions, difficult. Many of the symptoms by which the disease is most commonly judged to be present have been observed, when from certain considerations it was presumed, and *even from dissection it appeared*, that there had been no internal inflammation ‡;

* *Analect.* cap. 1.

† Cullen, *Syn. Nos.* tom. ii. p. 91.

‡ It is in cases such as these, I imagine, where the symptoms of *phrenitis* have taken place, without any visible alter-

and, on the other hand, dissections have shewn that the brain had been inflamed, when few of the peculiar symptoms of *phrenzy* had before appeared*.”

In attending to the definitions usually given of inflammation in the brain, one would be led to suppose it always a most acute disease, characterized by the most striking symptoms, and running its course with rapidity and violence †. From what has been already said, it is clear that such a character does not essentially belong to it. In the *epidemics* of Hippocrates, many cases of *phrenitis* are to be found, where

attention of structure being perceived after death, that the fanciful distinctions of *phrenitis* and *paraphrenitis* have been made; as if, in the latter case, the diaphragm were the seat of the disease. Some have referred the symptoms in these cases to the stomach; others, to an irritation or confusion of the *animal spirits*.—In reality, they serve only to shew the imperfection of anatomical investigations, and the incompetency of these, on many occasions, to detect the seat and intimate nature of diseases. See *chap. 1, § 4 and 25.*

* *First Lines of the Practice of Physic*, ccxcii.

† Boerhaave, following Hippocrates and Galen, says, a true *phrenzy* kills on the third, fourth, or seventh day, rarely exceeding the latter period (*Aph. 774*). It is plain that this only applies to the most acute form of the disease.

the disease ran out to the seventeenth, twenty-fourth, and thirteenth day, and even beyond. Van Swieten observes, that the violent symptoms which sometimes accompany *phrenitis*, are not always present—"non semper tamen talis ferocia adest,"—"dari enim *phrenitides*, et *pessimos* quidem, in quibus ægri obscure delirant, absque ulla ferocia, ex Hippocrate et Galeno ibidem demonstratum fuit*."

The symptoms which indicate the brain to be inflamed, are very different according to the violence of the disorder, and the particular stage of it. This is especially observable in *hydrocephalus acutus*, a disease now known to be founded originally in inflammation, though its true nature was for a long period overlooked. In this, though a primary affection, there is neither to be found in general the "pyrexia vehemens," nor the "delirium ferox;" the symptoms, in the early stage, are those merely of ordinary fever, and often not to be distinguished from it. If, therefore, inflammation in the brain produces, in this instance, merely the ordinary

* *Aph.* 771.

symptoms of fever, the presence of such symptoms on other occasions, might naturally lead one to suspect a similar cause: a suspicion which dissection has very often proved to be well founded. That inflammation in the brain has not *always* been discovered after fever, admits, I think, of a satisfactory explanation; as I shall endeavour to shew hereafter.

As the most acute symptoms above described are sometimes wanting in *phrenitis*, so, on the other hand, they are occasionally present in *idiopathic* fevers. In such of these as are very violent, it is not uncommon to observe for a time the *pyrexia vehemens*, and the *delirium ferox*; and with regard to the other parts of the definition of *phrenitis*, given by Dr. Cullen, namely, the "*capitis dolor*," "*faciei rubor et oculorum*," "*lucis et soni intolerantia*," "*pervigilium*," and "*typhomania*," it is difficult to say whether they more frequently accompany *phrenitis* or fever: in aggravated and *malignant* cases of the latter, they are scarcely ever absent.

Who but would suppose, on reading the following description by Galen, that he was

giving the history of *malignant* fever simply?—
 “Oculos habent vehementer squalidos, et ex altero ipsorum acris lachryma effunditur, ac deinde lemas habent, et venas ipsorum sanguine plenas; et sanguis stillat è naribus. Quo tempore, neque jam planè ut mentis compotes respondent, floccos avellunt, et festucas carpunt, &c. Quid dicam de linguâ asperâ, auditu quandoque hebetiori, tum quod interdum moesti jaceant, vix respondentes, &c*.”—Yet this is given as a description of the *phrenitis vera*.

The characters given of *cephalitis*† and *sphacelismus*‡ by Sauvages and Linnæus, that is, of inflammation of the substance of the brain, in contradistinction to the inflammation of its membranes, which they denominate *phrenitis* exclusively, apply very nearly to the *typhus gravior* of Cullen, the *putrid, malignant, or petechial* fever, of other authors. *Cephalitis* is described in these terms by Sauvages:—“Febris

* Galen, *De locis Affect.*, lib. 5. c. 4.

† Sauvages, *Nos. Method.*

‡ Linnei, *Gen. Morb.*

acuta, cum delirio somnolento, et carpologia;” and the *sphacelismus* of Linnæus, is thus defined:—“Febris synochus, delirium, carpologia, asthenia, immobilitas, anæsthesia, aphonia.”

It is evident, therefore, that *phrenitis* and *idiopathic* fever have not been accurately distinguished from one another, even by the best writers; indeed, the similarity of symptoms in the two is on many occasions so great, that it is scarcely possible to discriminate between them; an irresistible argument, in my opinion, is thus afforded of the identity of their nature, and of their being merely different modifications of the same topical affection.

It may be observed further, that the signs of danger and approaching dissolution, are the same in *fever* as in *phrenitis*. Thus *stridor dentium, nervorum tremores, flocculorum carptio, sopor, palpebræ oculorum haud penitus vel inæqualiter commissæ, et excretiones inscio ægro peractæ*, are mentioned by Hippocrates as symptoms indicating a fatal termination in *phrenitis**; and every one knows they consti-

* *Prorrhætic*, lib. 1. c. 1.

tute the fatal signs of fevers of all descriptions. It has been remarked by Dr. Cullen, in the passage quoted above, that *phrenitis vera*, or idiopathic phrenzy, is a rare occurrence; and Dr. Home, in his *Principia Medicinæ*, says, “rarissime in hisce regionibus apparet*.” But from what has been already said, it is evident in what sense this assertion is to be understood. It applies only to that variety of *phrenitis*, where the most acute symptoms are present, viz., the *pyrexia vehemens*, and the *delirium ferox*. As, however, it has been shewn that these symptoms are by no means necessary to constitute the disease, but are, on the contrary, often wanting, it must immediately appear that inflammation of the brain is more frequent than has been stated by these writers. Indeed, when the abundant supply of blood to the brain, and the proximity of this organ to the heart, are considered, circumstances which invariably dispose to inflammation in other organs; when we consider, also, that a great portion of it, to wit, the *cortical*, is made up, as

* *Princip. Med.* p. 2. sect. 3, 4.

it were, of innumerable blood vessels*: and when we reflect, at the same time, on the numberless causes which may and do occasion, what is called an *increased determination* of blood to the head, as violent exercise, spirituous drinks, passions of the mind, &c.—the brain, of all organs, might be expected to be the most prone to inflammation. That such causes do actually induce an increase of action in the arteries of the head, is evident from the flushing of the face, the throbbing in the temples, &c., which so immediately result from their application. Such increased arterial action is not, indeed, actually inflammation; but it is a step towards it, and into which it soon runs if further urged.

The strong propensity of the brain to inflammation, in different degrees and in different parts, is shewn by the great frequency of its diseases. Hence the frequent occurrence of *hydrocephalus acutus* in infancy; of epilepsy and chorea, at a later period; and of insanity,

* Ruysch demonstrated by injections, that the *Cortical* substance of the brain is chiefly composed of vessels.

apoplexy, and palsy, with the whole tribe of *nervous disorders*, in advanced age; hence, too, the frequent headaches, so nearly bordering on inflammation, (into which, indeed, they often degenerate,) that take place in every period of life.

Hence, likewise, the appearances noticed by writers on morbid anatomy, indicating antecedent inflammation of the brain or its membranes; as induration, callus, ossification, effusion, preternatural redness, aneurism, hydatids, concretion of parts, and abscess itself; all of which are among the most ordinary occurrences met with, in the dissection of morbid bodies.

It must be at once evident, therefore, that there has been a mistake in the supposition, that inflammation of the brain, or *phrenitis vera* (for they are one and the same), is a rare occurrence. The fact is, that the disease has been often overlooked, as we know to have been the case with regard to one species of it, viz., the *acute hydrocephalus*, which, for ages, was misunderstood; *secondary* and remote symptoms having both given name to the dis-

ease, and afforded the indications for its cure. The same thing, I apprehend, has happened with regard to *fever*: the *secondary* symptoms have chiefly attracted notice, and been considered as the disease, whilst the *primary* and *essential* affection has been overlooked. The error was productive of practical mischief, in the case of *hydrocephalus*; and it has probably not been without unfavourable consequences, in regard to the treatment of *fever*.

It is allowed on all hands, that inflammation of the brain does frequently occur in fever; and the combination, in my opinion, is by much too common to be merely accidental. An author, before quoted, remarks, that it associates itself with almost all fevers, but especially the *malignant*, *variolous*, and *camp* fever*; but then it is supposed to be merely *symptomatic*, and not essential to the disease. This is only to be judged of by examination of the symptoms of *fever* during its whole course, and a comparison of them with those which peculiarly belong to inflammation of the brain. It

* Home, *Princip. Med.*, loc. cit.

has been shewn that the character of *phrenitis*, as usually given, is ambiguous and equivocal. Inflammation of the brain, it has been proved, may be present without the symptoms commonly ascribed to *phrenitis*; and, on the other hand, undoubted signs of recent inflammation in the brain have appeared after death, where none but the ordinary symptoms of *idiopathic fever*, had manifested themselves during life; as will be shewn more fully hereafter.

The occasional causes of *phrenitis* and of *fever*, are in many instances the same. External violence, exposure to the burning rays of a vertical sun, the excessive use of spirituous liquors, and vehement passions of the mind, are known to give rise equally to *phrenitis* and to *fever*. Certain kinds of food taken into the stomach, and some poisons, as *opium*, *hyosciamus*, and the like, have been said to occasion, at different times, both *phrenitis* and *fever*.

The symptoms which succeed to injuries inflicted on the head, some days after the accident, and which are known to depend upon the coming on of inflammation in the brain, have

often every character of *idiopathic* fever, and have repeatedly been mistaken for it. Many instances of this sort are to be found in surgical writers. Mr. Pott mentions the case of a woman who was brought into St. Bartholomew's Hospital, labouring, as it was supposed, under ordinary fever, and put under the physician's care accordingly. The pulse was full and hard, the skin hot and dry, the tongue furred and black; there was nausea, with disposition to vomit; thirst, intolerable headache, and *pervigilium*. The common treatment of *fever* was had recourse to. On the following day, however, a tumour was accidentally discovered on the scalp, which being opened, the bone was found to be bare, and, beneath this, purulent matter lodged on the *dura mater*. This, on inquiry, proved to be the consequence of a blow received on the head eight days before, and which was not suspected, at the time of her admission into the hospital, to have any connexion with her disorder. Had this discovery not been made, it is probable the patient would have been considered to die of common fever *.

* Pott on *Injuries of the Head*, case 7.

A man received a slight wound on the head, which being healed by the third day, the patient was discharged from the hospital cured. A week afterwards, he was brought again to the hospital as a *fever* patient, was put into the *fever* ward, and treated accordingly by the physician, during the space of four days. He was comatose, with a central pulse inconceivably languid: his senses were clear, but he was prevailed upon with difficulty to answer questions; he had some convulsive motions in his face, with a grinding of the teeth. By mere accident he made complaint of a slight pain in the part where he had received the stroke, and this led to the detection of the real nature of the case*.—Had the interval between the wound and the subsequent symptoms, in this case, been a little longer; or had the patient not been sent to the same hospital as at first; it is probable he would have been treated as a *fever* patient throughout.

The mode of cure found most successful in *phrenitis*, is applicable also, in a considerable

* Le Dran's *Obs. in Surgery*, obs. 25.

degree, to *fever* ; due allowance being made for the habit of the patient, and the stage of the disease. In the acute form of *phrenitis*, blood-letting, with all the other antiphlogistic remedies, is principally relied on. In the most violent forms of *fever*, *blood-letting* appears, from experience, to be no less necessary, as will be seen hereafter. In the chronic form of inflammation in the brain, and in such as takes place in scrofulous children, the same liberal evacuations are probably not admissible, any more than they are in certain states of fever.

The mutual convertibility of *fever* and *phrenitis*, as mentioned above, furnishes an argument of some weight, in favour of the identity of the two affections. In the course of ordinary fever, the delirium often assumes, for a time, an active character, resembling altogether that of *phrenitis* ; while the latter commonly degenerates into the apoplectic stupor of *malignant fever*, before it proves fatal.

It appears, then, that *idiopathic fever* and *phrenitis*, have their most essential symptoms in common, all of which are referable to the

brain and its functions; they are produced by similar causes; and the *prognosis* is the same in both. The feelings referred by the patient to the head in *fever*, are just the same with those of other inflamed parts, viz., pain, heat, and throbbing; whilst the functions of the brain are in every case more or less deranged: and lastly, the general state of the system is the same as in other internal inflammations, due allowance being made for the influence which the brain exerts over various parts of the body, which tends not a little to modify the general affection. There seem to me, therefore, the strongest reasons for concluding, that the inflammation of the brain in fever, is not merely casual and *secondary*, but *primary* and essential; in short, that it is the disease itself.

SECT. XX.

OF FEVER, AS COMPARED WITH HYDROCEPHALUS
ACUTUS.

UNTIL a comparatively late period, the *acute hydrocephalus* of infants seems to have been either greatly overlooked, or confounded with other affections, such as *teething* and *worms*; which, however, appear to have no other connexion with it, than that they sometimes act as exciting causes of the disease. It was not referred to inflammation of the brain, or its membranes, as the *proximate* cause. If the disease proved quickly fatal, (as it often does in very young infants) it was thought enough to call it a case of *convulsions*, occasioned, as above-mentioned, by *dentition* or *worms*, and in such cases of sudden termination, slight traces only of cerebral affection are discoverable after death. If the disease were milder, and therefore protracted to a longer period, it was classed with *dropsies*, as the name implies, and a mode of

treatment applied in consonance with such a notion. Even very lately it has been attempted to be shewn, that the disease has no necessary connexion with inflammation, and that when this does actually occur, it is an accidental circumstance, as has been supposed to be the case in regard to *fever* itself. Few, however, I believe, at present hesitate in referring the ordinary acute form of *hydrocephalus* to inflammation, as its immediate cause; and upon this supposition I shall proceed in drawing a parallel between the two affections.

In the two extremes of infancy and manhood, although the analogy between *hydrocephalus* and ordinary fever, in regard to the *essential* symptoms is sufficiently strong, there is yet a considerable difference in many points, and which is ascribable to circumstances connected with the age of the individual. In very young subjects, slight irritations in any of the most distant parts of the system, readily induce great disturbance in the brain, the functions of which become disordered in consequence. Thus it is, that general *convulsions* take place,

often, with an abolition of all the *sensorial* functions, quickly terminating in death in many instances. The first accession of inflammation in the brain itself, (to become afterwards *hydrocephalus*) is also often attended with *convulsions*, which make their appearance the more readily and frequently, the younger the subject is.

From natural constitution, membranous inflammation in infants sooner terminates in watery accumulation than in adults; and hence the more frequent and early occurrence of *hydrocephalus* in infants, as a consequence of inflammation in the brain or its membranes. The oppression of the brain thus induced, gives rise to a peculiar train of symptoms; and this has led to the supposition that the disease itself was of a different nature, a supposition for which, however, there is no necessity, and which is not founded in fact. The general *convulsions*, the slow and irregular pulse, the distortion of the eyes, the dilated pupil, &c., that take place in a more advanced stage of the disease, are all in addition to the ordinary symp-

toms of *fever*, as it occurs in adults, in whom, neither the *convulsions*, nor the same striking and early proofs of *oppression* of brain, in general, appear; or not till an advanced period of the disease. According to the age of the patient, as varying between the extremes of infancy and manhood, the symptoms incline either to those of *hydrocephalus* or those of ordinary *fever*; a tolerably regular gradation being observed. At from four to ten years of age, the symptoms diverge from those of *hydrocephalus*, and approach more and more nearly the character of common fever. *Convulsions* seldom appear after the second year, unless they have before occurred. After this period, the disease, during the first few days, has merely the characters of ordinary fever, but generally with more active symptoms, greater heat of skin, and greater frequency of pulse, the result, doubtless, of the greater share of vital energy that characterizes early life. From the same cause it is, that the powers of life are sooner exhausted in infants, and the sooner injury is done by the disease to the organization. And

hence the disease proves the more quickly fatal. In adults, the fever is often protracted to three weeks or even more, proceeding all the while with considerable violence. In infants, the duration of the disease is comparatively short, for reasons that are sufficiently obvious, and which have been already mentioned. It either soon subsides, or it destroys life, partly by the mere violence of action, incompatible with the due performance of the functions; partly by the *oppressed* state of the organ, the result, not merely of the watery accumulation, but of the excited and dilated state of the arteries, compressing the veins, and thus impeding the current through them. In a word, *hydrocephalus*, in infants, is the same disease as *idiopathic fever* in adults. The seat and nature of the disease are the same, the essential symptoms also; while the differences are easily explained. The treatment likewise is the same, and regulated by the same circumstances of age, individual constitution, and above all, the more or less advanced stage of the disease. If any difference exists in regard to the treatment,

it is in the greater necessity there is for prompt and active measures in the case of infants, on account of the more rapid progress the disease in them is apt to make. In both cases, *blood-letting* is the remedy that chiefly merits confidence ; and, in both, when sufficiently early employed, it may be resorted to with equal safety and success.

It may be gathered from what is said above, that I consider *hydrocephalus*, in its simplest state, to be the result of inflammation of the *membranes* alone. There are such cases, but they are *comparatively* few. The disease, in general, is a compound affection, involving both the membranes and the brain itself, as the symptoms clearly shew.

SECT. XXI.

OF DISSECTION, AS ILLUSTRATING THE NATURE
OF FEVER.

THE arguments hitherto advanced in support of the opinion, that *idiopathic* fever consists *essentially* in a topical inflammation of the brain, are derived principally from analogy, and an investigation of the phenomena of the disease, in relation to the peculiar functions of that organ. It might naturally be expected, that dissection of the bodies of those in whom the disease had proved fatal, would remove all doubt from the subject ; and at once either satisfactorily establish or overthrow the opinion in question. But although much light is undoubtedly to be derived from this source, and we shall find, in fact, that every support is afforded to the supposition that could reasonably have been looked for, yet the evidence furnished by dissection is not absolutely conclusive ; and that for different reasons.

In the first place, the wonderfully minute and delicate structure of the brain renders it unfavourable for accurate examination*. Of this complicated organ, made up of numerous parts, the particular uses of which are still in a great measure unknown, our knowledge is exceedingly limited. It more quickly undergoes a change in its texture than almost any other organ, by which it becomes soft and unresisting, rendering difficult or fruitless all attempts to observe it narrowly. This tendency to decomposition in the brain comes on, in general, so rapidly after death, that we are probably but little acquainted with its perfectly sound and natural appearance.

In the next place, it is to be considered, that by far the greater number of demonstrations of the human body, given by anatomists in the schools, and from which our knowledge of the structure and appearance of the brain is princi-

* "The substance of the brain is so soft, and the fibres so tender, that they can hardly be touched without breaking : —anatomy has not hitherto arrived at that degree of perfection as to make the true dissection of the brain." —(Steno's *Diss. on the Brain.*) see Winslow, sect. 10. § 195.

pally derived, are of subjects destroyed by diseases, many of them, no doubt, of this very organ. And when we reflect, further, on the sources from which the anatomical theatres are chiefly supplied, namely, the most indigent classes of society, a considerable number of whom are daily cut off by fevers, it must appear highly probable, that what is considered and exhibited as the natural and healthy state of parts, is often in reality a diseased one, perhaps the immediate consequence of fever itself, and which we have not yet learned clearly to distinguish from the state of health*. It is

* An instance of this came very lately within my own knowledge. The brain of a person dead of small-pox was exhibited before a number of students, in the ordinary course of demonstration, in the dissecting room of a public teacher of anatomy. And although the blood-vessels in general were turgid, and the membranes in many parts suffused with blood, like the coats of an inflamed eye (appearances that are very commonly observed after small-pox, and, as far as my observation has yet gone, in greater or less degree in fevers in general), no notice was taken of circumstances so strongly indicating inflammation; and, of course, the students went away impressed with the idea, that what they had seen was the natural state of parts. How then, I would ask, could they be afterwards qualified to detect or describe the morbid appearances of such an

almost needless to observe, with respect to this, that where the sound and natural state of a part is imperfectly known, it is quite impossible that the morbid changes of structure to which it is liable, should be well understood. What we, therefore, so commonly meet with in books, as to the state of the brain in regard to *hardness*, *softness*, *colour*, *fullness*, or *emptiness* of vessels, &c., is perhaps little to be relied upon. Not that such appearances do not really exist, or are unfaithfully described, but because we have no certain standard of health to which we can refer them, as objects of comparison. Nor can we readily tell, in all cases, whether the changes observed are the effects of disease, or of a beginning decomposition of parts.

Further, it is to be suspected, that those who have taken upon them to observe and report on the state of this organ after death, have

organ? excepting, indeed, the grosser changes of structure and disorganization, as *suppuration*, *extravasation*, or *effusion*; these are too obvious to escape notice; but they, probably, bear but a very small proportion to the number of slighter derangements in the structure of this organ, many of which may elude the observation of the most skilful anatomist.

not always been fully competent to the task. "Paucae quidem," says Sömmering, "extant huc pertinentes observationes à viris structuræ corporis humani adprimè gnaris descriptæ*." That inflammation of the brain, though present in fever, has been sometimes overlooked, even by practical anatomists, is evident from the following:—

Bonetus, describing a case of fever where the patient died with lethargic symptoms, says, "on opening the head, the *dura mater* appeared slightly inflamed; the vessels of the *pia mater*, in their course to the third *sinus*, were of three times their usual size, *but without inflammation*, and the *sinus* itself was full of blood. The surface of each ventricle was *rough, unequal*, and flaccid, and *covered with a viscid purulent fluid**." Fontanus relates the case of a young man, who, on the ninth day of a *tertian*, was seized with the symptoms of *phrenitis*, and lived till the sixty-fifth day. The brain, on inspection, he says, was found *without injury*, but marked in

* *De Corp. Hum. Fab.*, tom. 4. sect. 11.

† *Boneti Sepulchret. Anat.*, lib. 4. sect. 1.

various parts with bloody spots—*maculis sanguineis undequaque respersum*.—The *pia mater* was turgid with blood, *et ramuli ejus tumidi et accensi*.—This shews how little reliance is to be placed on general assertions, in this and many other cases, that the brain had suffered no injury. Clearer marks of disordered vascular action could not well exist, than are to be found in the descriptions just quoted.

On the other hand, anatomical investigations, instead of illustrating the nature of the disease, have sometimes involved it in greater obscurity, and given rise to the most absurd suggestions on the subject. The same Bonetus quotes with much solemnity, from Bartholin, a case of fever, in which the pancreatic duct was found to be obstructed; and to this obstruction was the fever ascribed—the pancreatic juice becoming acrimonious, by its lodgement, and from accumulation, after a time forcing its way into the duodenum, entered into fermentation with the bile, and thus produced the various symptoms of the disease.

To this may be added a dread of infection,

which has prevented the examination of the bodies of fever patients in the greater number of instances, and at the same time has rendered such examinations as have been made, hasty and unsatisfactory. Morgagni himself was a believer in the power of dead bodies to communicate infection; and he relates some striking instances of the sort. On this account, his great work, *De Sedibus et Causis Morborum*, is exceedingly defective in observations respecting the state of the brain after fever*.

For many ages, and nearly down to our own times indeed, the *immediate* cause of fever was supposed to be seated in the blood, or other humours of the body; hence these have been more regarded in dissections than the solid parts. Both Bonetus and Morgagni, when detailing the appearances observed by them after fevers, confine themselves almost entirely to the state of the blood, and of the abdominal

* “—Paucas naturæ scrutatoribus suppeditant observationes extispicia, cum ut plurimum nil spectatu dignum occurrat; vel cadaverum sectiones, *pro summo fatore aut contagii metu*, raptim et festinanter instituantur.”—Lieutaud, *Synop. Univ. Prax. Med.*, 4to. p. 25.

and thoracic viscera. The brain, in most instances, appears not to have been examined at all; and then only when its functions during life had been more than ordinarily disturbed; in such, however, manifest signs of preceding inflammation never failed to be discovered. But these writers have left us almost wholly in the dark, with regard to the state of the brain in ordinary cases of fever.

From one or other of the causes mentioned, examinations of the brain after fever have been very rarely undertaken. I am inclined to doubt indeed, from the inquiries I have made, whether half a dozen such dissections have *purposely* been instituted in this metropolis, within as many years last past; while, in all probability, a great number of brains of patients dying of fever have been dissected within the same period, and have been exhibited to the view of students as the natural condition of the organ.

But even allowing the examination to have been made under the most favourable circumstances, and by those best qualified for the task, the minute and subtle structure of the brain

opposes an obstacle which must, on many occasions, be nearly insurmountable. Many changes may have taken place in so delicate an organ, unfitting it for the due and perfect performance of its functions, which changes may yet not be manifest to the senses. Morbid conditions of parts often exist, without being discoverable by the eye or the touch of the practitioner. The change from healthy to diseased action, and still more from health to visible alteration of structure, is often by slow and imperceptible degrees. This is proved by the consequences. In cases of cancer, where every apparently diseased part has been removed with the greatest care, by excision, the disease is found to recur in the surrounding parts; rendering it probable that the first or insensible stage of disease had taken place in them before the operation.

The *medullary* part of the brain, which is not only the largest, but probably the most important in respect to its functions, appears, in the natural state, to be nearly homogeneous in its texture. Scarcely any blood-vessels (with

the exception of a few, that seem merely to traverse its substance) are discoverable in it, even with the best microscopical aid. Nor have artificial injections, however otherwise successfully made, been in general found to penetrate it; so that it appears to the eye, to be less furnished with blood-vessels than almost any other part of the body*. Even in the *cineritious* portion, which is evidently made up in a great measure of innumerable minute vessels, some parts are always found that have not received the injection†. No one, however, would venture to conclude from hence that the brain was of an inorganic texture, or destitute of vessels in any part. Such a conclusion would be opposed by the strongest analogy, as well as by the fact of abscesses being

* I speak here of the brain in its least vascular state, and which is probably the healthy state of the organ. Authors differ considerably in their accounts of the vascularity of the medullary part of the brain; this difference, I conceive, is only to be accounted for by supposing, that they have made their observations under different conditions of the organ, without distinguishing sufficiently between its healthy and diseased states.

† Sömmering *De Corp. Hum. Fab.*, Vol. iv. sect. 2.

occasionally found in the very centre of the medullary substance.

One of the chief signs after death, by which we judge of a part having been previously inflamed, is a greater redness than natural, the effect of an increase in the number and size of vessels carrying red blood. Such an appearance has, in fact, been very frequently observed, both after *fever* and *phrenitis*; but chiefly on the external surface of the brain, or in the membranes which line its cavities; that is, in those parts which, even in the healthy state, are furnished with blood-vessels sufficiently obvious to the sight. But it is not at all surprising, that the inconceivably minute vessels of the medullary portion, which in the sound state are altogether invisible, should not, even under inflammation, have their capacities sufficiently enlarged to admit the colouring parts of the blood.

Redness is certainly not an essential character of inflammation. In *hydrocephalus internus*, which, it is now almost universally agreed, owes its origin to inflammation, the only change

oftentimes, that can be observed in the parts after death, is a thickening and opacity of the *tunica arachnoidea*, a membrane which in the sound state is pellucid, and of extreme tenuity*. Had the *medullary* part of the brain been as diaphanous as its membranes, or as the crystalline humour of the eye, we should have been enabled to detect many changes in structure that now wholly escape our observation.

Many parts which, in the living and healthy state, admit only the colourless parts of the blood, readily receive a coloured injection after death; this is the case with the *tunica albuginea* of the eye, and the investing membranes of various parts: these are found, likewise, to become red by inflammation. But the medullary substance of the brain, and part also of the *cortical*, refuse to admit the finest colouring matters by injection; which seems to shew that their vessels are still more minute or impermeable than those of membranous parts, and therefore might be the less expected to be reddened by inflammation†.

* Sömmering, loc. cit.

† I have lately seen, in the extensive and beautiful col-

There is no difficulty, therefore, in supposing, that the brain may have undergone material changes in its structure from inflammation, though our senses are incompetent to detect them. In an organ of such importance in the animal economy, and which so materially influences the actions of other parts of the system, it is easily conceivable that such a degree of derangement may take place as even to prove fatal, without leaving behind it any visible traces: and in reality, such has often been the case. There are many instances recorded of fatal apoplexies, epilepsies, palsies, &c., where no perceptible change in the appearance of the brain could be discovered after death. External violence, too, as blows on the head, producing what has been termed by surgeons *concussion* of the brain, have often killed the patient, when, on examination, no adequate cause of the symptoms could be detected*.

lection of Mr. Langstaff, the medullary substance of the brain very finely injected, and it is particularly worthy of notice, that the subject died of what is called *typhus fever*.

* “ We see many die suddenly from a box on the ear, and from small blows or wounds; in some whereof, upon

Admitting, therefore, that the *medullary* substance of the brain is the *primary* seat of morbid affection in fever—a supposition that is warranted by the lesion of its functions, so constantly observed throughout every stage of the disease—we are not, for the reasons mentioned, to look for visible change of structure in every instance of fatal termination. Yet appearances unequivocally indicative of preceding inflammation of the brain or its membranes, are exceedingly common after fevers, as we learn from the testimony of various authors of credit who have investigated the subject.

Bonetus adduces a great many histories of opening the cranium, there hath been much blood extravasated ; in others none at all, nor *aught else* that may be thought to have killed the patient.”—Wiseman’s *Surgery*, book 5.—“ As the arteries dispersed through the *pia mater*, as soon as they enter the cortical substance, are immediately so minutely divided as to resemble a fine down, and are intermixed with, and accompany, the smallest medullary fibres ; it is easy to conceive that those tender and minute fibrils of the *encephalon*, upon which life and intellect depend, may be broken or compressed by such a shock, whence a lesion or even abolition of all the sensorial functions may take place, without any perceptible injury, or effusion of fluids within the skull.”—*Van Swieten*, Com. in Aph. 274.

fever, in which evident marks of inflammation in the brain were discovered after death. Amongst others, it will be sufficient to refer to his 34th *Observation*, which contains four cases of *causos* or *ardent fever*, where accumulation of lymph, abscess, and other unequivocal marks of antecedent inflammation, were found*. *Observation* 44, contains a case of fever, of the *tertian* type, attended, in the height of the paroxysms, with apoplectic symptoms, and which terminated fatally. On dissection, considerable aqueous effusion was observed within the skull†.

Morgagni, whose great work contains so many illustrations of the *seats* and *causes* of diseases in general, is remarkably defective on this point. The reason of this was hinted at above. He adduces some instances, however, from his preceptor, Valsalva, where, in the course of fever, apoplexy, and other affections indicative of derangement in the functions of the brain, took place, and in which serous effu-

* Boneti, *Sepulchret. Anat.*, Obs. 34.

† Piso, *De Morbis a Sero*, sect. 2.

sion, and other marks of preceding inflammation, were discovered after death *.

Lieutaud observes generally, with regard to *malignant* fevers, that abscesses, and sanious and purulent collections in the brain, are consequences exceedingly common †. In his *Historia Anatomico-Medica*, instances without number may be found, collected partly from the writings of others, and partly from his own observation, in which the brain, after fevers, exhibited the ordinary signs of inflammation. Nor did this occur only in one species of fever, or in combination with the symptoms usually considered as indicating *phrenitis* to have taken place: it was equally observed after fevers of various types, and the most dissimilar in character and degree; for example, in fevers of a *continued* form, and in *intermittents*, *tertian*, as well as *quartan*; in the more and in the less

* Morgagni *Epist.* 4, 6, 7, 8, *passim*.

† Abscessus pluries exhibuit caput apertum, tum in interioribus cerebri claustris, tum circa hujusce visceris ambitum; non secus ac stagnationes saniosas et purulentas in cerebri anfractibus, aliisque recessibus.—(Lieutaud. *Synop. Univ. Prax. Med.*, 4to. p. 25.)

acute; in those called *malignant* and *pestilential*; and likewise in fevers of the *exanthematic* kind. And it is especially deserving of notice, that such appearances were found in cases, which, during the course of the disease, had exhibited none of the symptoms usually ascribed to *phrenitis*, but merely such as are ordinarily observed in fever*.

Werlhoff says, that stagnation of lymph within the convolutions of the brain, and under the *pia mater*, was frequently observed in the bodies of those dying of continued fevers†. And Mangetus remarks, that *malignant* fevers have often *phrenitis* conjoined with them, and this without any remarkable effervescence of the blood, or violent febrile symptoms‡.

* Lieutaud, *Hist. Anat. Med.*: see particularly *Observations* 67, 185, 196, 270, 521.

† “Stagnatio lymphæ intra anfractus cerebri, et sub tenui meninge, sæpe reperta fuit in cadaveribus febre continua defunctorum, fortiter et continuo delirantium ante obitum.”—(*De Affectibus Capitis, Obs. 3.*)

‡ “Febres malignæ sæpius conjunctas habent phrenitides; et quidem hæ phrenitides in febribus malignis superveniunt, citra insignem sanguinis effervescentiam et corporis incalescentiam.”—(*Bib. Med. Pract., lib. iv.*)

Haller has remarked the same frequent combination of *phrenitis* with *malignant* fever *. The accession of inflammation in the brain, as an accidental occurrence, might easily be accounted for in the *inflammatory* form of fever, where the whole vascular system is acting in excess, producing a general tendency to inflammation in the system: but its occurrence in that depressed state of the general circulation which accompanies *malignant* fever, can only, as it appears to me, be explained, upon the supposition of its being the *essential* part of the disease.

Sir J. Pringle describes many cases of fever that occurred in his military practice, where he found abscesses in the brain of the dead subject. He mentions, in particular, the case of one that died of *malignant* fever, in whose brain three ounces of pus were found; yet there had been no delirium through the whole course of the disease †:—we learn from this, how little

* “In cadaveribus variorum *phrenitide*, *febris malignæ* symptomate, defunctorum, *pià meninx* adeo inflammata erat, ut colore atro-rubro inficeretur.”

† *Diseases of the Army*.—Is the absence of delirium in

the symptoms commonly supposed to denote the presence of inflammation in this organ are to be relied on.

Dr. Donald Monro, who devoted his earlier years to anatomical researches, and whose testimony upon this point, consequently, is of considerable weight, speaking of the petechial fever, in his *Treatise on Military Hospitals*, remarks, that "this fever occasions in general more or less redness (I do not know that we can properly call it true acute inflammation) of the membranes; and the febrile matter is apt to fall on particular parts, and there to create abscesses; particularly in the brain, the lungs, and the glandular "organs*." The theory of the agency of the febrile matter here given, may perhaps not very well accord with our present ideas in physiology; but the observation, as a matter of fact, sufficiently proves the alliance between fever and inflammation.

Vogel remarks, that dissections of persons

this case attributable to the disease being seated principally in the *cerebellum*?

* *Treatise on Military Hospitals*, 8vo. Vol. I. p. 237.

dying of *typhus*, very frequently exhibit inflammation, suppuration, and even gangrene of the brain*. And Chambon observes, that the substance of the brain, in every part, is often found harder than natural after *malignant* fevers † :—this we know to be a common effect of inflammation in other parts.

The *tunica arachnoidea* is not unfrequently observed in dissections to be separated from the *pia mater*, by the interposition of a gelatinous fluid: “this,” Dr. Baillie, in his *Morbid Anatomy*, remarks, “is not an uncommon appearance of disease, *particularly after fevers*, where the brain has been a good deal affected ‡.”

Dr. Jackson says, speaking of the *yellow fever*, “the brain appears upon dissection to be more or less affected in the majority of subjects who die in the acute state of the disease, or under the actual influence of fever; the membranes are then inflamed, or the blood-vessels turgid to an extraordinary degree, give an ap-

* Handbuck der Pract. Artzn., &c.

† Obs. Clin. Pract. 1789. obs. 29.

‡ Morbid Anatomy, p. 294.

pearance of commencing gangrene, rather than that of inflammation properly so called : water is sometimes found in the ventricles, with evident effusion in the interstices, but this is an effect, not general, nor even frequent."

A host of other instances might be adduced to prove, that fevers of all descriptions very frequently leave behind them visible topical affections of the brain, demonstrating the existence of previous inflammation in that organ. It is not, however, to be imagined, that the appearances now mentioned are to be found in every case of fever. The *essential* part of this, as of most other *primary* diseases, consists, not in the altered structure of parts, but in morbid *action* : change of *structure* is a remote effect, a consequence, merely, of the morbid action, and is what may or may not take place. Hence, if the disease prove fatal before such alteration of structure is induced (which may well be supposed to happen with respect to an organ, upon the state of which all the functions of the system more or less immediately depend), few or no traces of the disease can be expected to be seen

after death. The *intermissions* of fever, during which patients often enjoy an almost total exemption from disease, and the speedy return to perfect health after their cure, prove that no great derangement of structure can have taken place. That fever does not *necessarily* kill by destroying the organization of the brain, is shewn also by the return, in some few instances, of the mental faculties a short time before death, where delirium had been present throughout the previous course of the disease.

One obvious cause of obscurity with regard to the *primary* seat of disease in fever, and a reason why dissection has failed to point it out, is that patients are often cut off by the *consequences* of fever, rather than by the fever itself; by inflammation of other organs coming on during its course, modifying the character of the original disease, and ending in disorganization of the part *secondarily* affected. In hot climates, such occurrences, as before observed, are exceedingly common, particularly with regard to the abdominal viscera, to which the examination after death has been principally con-

fined. "It is a fact worthy of remark," says Dr. Jackson, "that of all the Europeans who fall victims to the diseases of tropical climates, two thirds, under ordinary circumstances, yield to the *effects*, rather than to the direct influence of the acute malady; that is, to obstruction or changed organization of one or other of the viscera *."

What has been just remarked enables us to understand an observation of Morgagni, "that there are many cases of *synocha*, which, if the bodies of those dying of it be examined, either exhibit nothing that points out the particular seat and nature of the principal affection, or else they shew, indeed, great and manifest lesions of structure in the viscera, but which, if compared with the symptoms of the disease, appear evidently to have been produced by some other latent primary affection †."

Upon the whole, although visible lesion of structure in the brain from inflammation, be neither a necessary, nor a constant effect of

* *Outlines of Fever*, ch. 12. sect. 1.

† *De Sed. et Caus.* epist. 3.

fever, yet is it too frequent an occurrence, to allow us to consider it as merely accidental; while the signs of disordered vascular action tending to disorganization, are never wanting. Were our means of observation more accurate, and our diligence greater, it is probable that in most, if not in all, fatal terminations of fever (where the patient is cut off by the fever itself, and not by supervening diseases), we should be able to detect some change in the colour, consistence, transparency, or other physical property of the organ, indicating a corresponding change in the action of its vessels.

But it may be said, that disorganization of parts (the effect of inflammation,) after fever, is by no means confined to the brain; other organs, as those of the thorax and abdomen, frequently suffer in a similar way. This is undoubtedly true; but there is this striking difference to be observed: disorganizations in the viscera of the thorax and abdomen are always, I believe, preceded by symptoms clearly denoting these organs to be under a state of inflammation, such as cough, pain in the chest,

and impeded respiration; or, acute pain in the abdomen, vomiting of æruginous, black, or bloody matter, diarrhœa, or dysentery,—and these, in addition to the proper characteristic symptoms of fever, namely, the derangement of the *sensorial functions*, which is never wanting in any variety of the disease. But with regard to *idiopathic fever*, the case is widely different: disorganization here has been repeatedly detected in the brain, where, during life, none of the symptoms commonly supposed to denote the presence of *phrenitis* had manifested themselves, but merely those which characterize ordinary fever. The conclusion appears to me irresistible:—that the symptoms of fever are the symptoms of inflamed brain, and that the latter is the immediate cause of the former; or rather, that fever and inflammation of the brain are identical affections.

SECT. XXII.

OF THE OPINIONS OF AUTHORS, WITH REGARD TO
THE SEAT AND NATURE OF FEVER.

THE great frequency of fever, the severity of its symptoms, and the fatality so often attending it, have made this disease an object of particular attention to medical practitioners in all ages. Innumerable speculations regarding its nature or proximate cause, have, in consequence, been entertained; and it has formed a constant theme for disputation in the schools, from the beginning of the establishment of physic, as a science, to the present time. Each succeeding inquirer, however, into this abstruse and intricate subject, appears to have been more successful in overturning the hypotheses of his predecessors, than in establishing any satisfactory and permanent doctrine in their stead. It is by no means my intention to impose on myself the task of discussing minutely

the various opinions that have prevailed in different ages, respecting the seat and nature of fever. Such an attempt might exhibit a parade of erudition, but could lead to no practical result. My principal object will be to shew, that, whilst the generality of doctrines on the subject of fever have no other foundation than conjecture and the wildest hypothesis, more than one writer will be found whose opinions, when carefully examined, lead to conclusions in a great degree similar to those which are here contended for.

The term fever has been used with great latitude, and very differently by different writers; as will appear from the definitions of it that have been given. All, however, seem to have been forcibly struck with the increase of heat so commonly observed to accompany fever; and hence, in almost every language, the denomination of the disease has a reference to this symptom. Not that excess of heat belongs exclusively to proper fevers, or is even found to accompany them in every instance: it is nevertheless so common an attendant on them,

that we need not wonder it should have been, in general, supposed to constitute the most essential symptom. Hippocrates considered increase of heat as the chief and characteristic sign of fever; and he formed his division of fevers, in some measure, upon this idea; as may be instanced with regard to the *causos*, or burning fever; the *leipyria*, with the external parts cold while the internal are in a violent heat; and the *epiala*, or the simultaneous feeling of heat and cold. Galen defined fever as consisting in preternatural heat, attended with increased strength and velocity of the pulse.

The increase of heat in fever, was ascribed by Hippocrates to different causes, internal and external; as too great fulness of vessels, excess or faulty constitution of the bile, obstruction of the extreme vessels, and *miasmata*: each of these, in his opinion, giving rise to a particular species or variety of the disease. It is easy to perceive the use that succeeding writers have made of these different hypotheses, which, with various modifications, have served to form the basis of many modern systems.

It is not necessary here to prove, that mor-

bid increase of heat in the system, takes place in a variety of diseases besides proper idiopathic fever, while in some cases of the latter, during a considerable part of their course at least, it is altogether wanting. This has been sufficiently shewn in the description of the phenomena of the disease above given. And the same may be observed of the frequency of pulse, which is neither constant, nor peculiar to fever.

Erasistratus placed the seat of fever in the vascular system, to which his anatomical investigations seem particularly to have directed him. Conceiving, as was customary among the ancients, that the arteries naturally contained air, and not blood, he imagined that the blood escaped from the veins into the arteries, owing to the over-fulness of the former, and thus gave rise to the phenomena of fever *. This is, perhaps, the first instance on record of the doctrine of *error loci*.

Asclepiades, who was a great innovator in

* Celsus, *de Medicina*, lib. 1.

physic, took up the idea of obstruction* as the *immediate* cause of fever, though he admitted increase of heat to be the leading symptom. He applied the *Corpuscularian* doctrine of Democritus to the subject, and endeavoured to explain the different types of the disease by the different size of the corpuscles forming the obstruction; thus the corpuscles were supposed to be of the largest size in the *quotidian* form of fever, smaller in the *tertian*, and least of all in the *quartan* type †.

Themison referred all diseases to a too rigid or too relaxed a state of the *solids*—*strictum nimis vel laxum*;—fevers, he supposed to originate in the former source. This doctrine agrees with that of Hippocrates and Asclepiades, in the idea of obstruction, though it refers the cause to the *solid* instead of the *fluid* parts, and seems to answer in a great measure, to the *spasmodic* doctrine of modern times. Galen overturned this hypothesis, and revived the

* *Manantia corpuscula per invisibilia foramina subsistendo iter claudunt.*"

† *Cœl. Aurel., lib. 1. cap. 14., and Celsus. Prefat.*

humoral pathology of Hippocrates, though with considerable modifications and additions.

Galen himself discusses the question concerning the *proximate* cause of fever at considerable length. He looked upon heat to be the most characteristic symptom, as before observed, but thought that it must be communicated to the heart in order to constitute fever; this is the organ, therefore, in which he places the seat of the disease. In the development of his doctrine, he has recourse to the hypothesis of almost every preceding writer. Thus, he admitted three divisions of fever; as the *hectic*, in which the *solid* or containing parts were concerned; *humoral*, or those where the cause of the disease was lodged in the *fluids*; and the *ephemeral* or transitory species, caused, as he supposed, by a too rapid motion or disturbance of the *animal spirits*. The *humoral* fevers were supposed to vary again, according as the blood, bile, phlegm, or other humour, was particularly vitiated.—Ætius was a follower of Galen, except with regard to the *synochus*, or purely inflammatory fever, which he ascribed to an

ebullition or effervescence of the blood, and not to any depraved state of the vital fluid.—Athenæus, of the *pneumatic sect*, supposed a *putrescent* state of the fluids to be the essential cause of fever, an idea that has been very prevalent in modern times; and Hippocrates himself obscurely hints at it.

Diocles Carystius, according to Galen*, looked upon fever to be never a *primary* disease, but always a symptom of some other affection; an idea that appears to be well founded, if by the term fever he meant only the disordered state of general vascular action, which I believe to be as truly *secondary* and symptomatic in *idiopathic* fever, as it is in other inflammations.

Avicenna, and the rest of the Arabian school, adopted in a great measure the doctrines of Galen, with modifications that scarcely merit notice.

Thus things stood till the revival of letters in the sixteenth century, when the chemical sect of physicians appeared, at the head of whom

* Galen Op., tom. 4. p. 438.

stands Paracelsus. This extravagant writer, in explaining the nature of diseases, decried the doctrines of the Galenists, and introduced into pathology a jargon of chemical terms, as sulphur, nitre, mercury, acid and alkaline, &c. ; not with the precise signification in which they are at present used, but in the most vague and ideal manner. To this, the *mechanical* theory succeeded, and the doctrine of *obstruction* was revived. The mechanical and chemical doctrines were now blended in a thousand different ways, and occupied the attention of physicians down to the time of Stahl and Hoffman.

Van Helmont's *Archæus*, which he employed as his principal agent in explaining the phenomena of fever, as well as of other diseases, was only a wild adoption of the *sentient principle* of Hippocrates, and analogous in great measure to the *Vis Medicatrix Naturæ* of Galen and others, and to the *Autocrateia* of Stahl.

The discovery of the circulation of the blood introduced material alterations into the theory of physic, and of course into that of fevers,

which constitute so large and important a part of the science. The brain and nerves, which before had been greatly overlooked, began about this time to assume much consequence, both in physiology and pathology. Borelli appears to have been the first who ascribed the *proximate cause* of fever to a derangement in the functions of this part of the animal frame*. Willis succeeded in the same rout; admitting the very questionable existence of a nervous fluid as the principal agent of vitality, he supposed an acrimony or vitiated state of it to constitute the *immediate cause* of fever. Others conceived the idea of laxity of the nerves at their origins in the brain, whence an incongruous matter was admitted into them, disordering their functions, and disturbing, in consequence, the actions of the whole system†.

It was the opinion of some of the mechanical physicians, that in fever there was an augmented velocity of the blood in the large vessels, with a diminished velocity in the small ones,

* *De Motu exandescentiæ febrilis.*

† Cole, *Nov. Hypoth. de Feb. c. v.*

the effect of obstruction; and that this retardation of the circulation in the extreme vessels occasioned an increased impulse of the heart, in order to overcome the impediment to the free and equable transmission of the blood.

Hoffman imagined the proximate cause of fever to consist in an *universal spasm* of the nervous and fibrous system; he thus expresses himself: “*formalem febris rationem, sive ut ita loquor, fundamentalem causam consistere in spasmodica universi generis nervosi et fibrosi affectione, quæ maxime, ex medulla spinali procedit, et successive ab exterioribus ad interiores partes vergit**.” And again—“*Febriles motus nihil sunt aliud, quam universales systematis vasculosi nervosique spasmi†.*”

Dr. Cullen, while with Hoffman he admitted the existence of a *spasm* on the extreme vessels, asserted a prior link in the chain of phenomena, viz., *debility* or *collapse* of the brain, propagated especially to the extreme vessels, and produced by the supposed *sedative* nature of the remote

* Hoffmanni Op., tom. 11. p. 10. 4to.

† Consult. et Respons Med. cent. 2.

causes, which, as before observed, he limited chiefly to two sources, human *contagion* and marsh *miasmata*. This spasm he considered as a kind of *re-action*, induced by the *vis medicatrix naturæ*, and which, in its turn, occasioned increased action of the heart and arteries, by which the lost energy of the brain was restored, and the spasm of the extreme vessels finally overcome.

Of the hypotheses now mentioned, some are merely conjectural, founded on the supposition of a state of the system which has never been demonstrated to exist. Of this description are the *error loci* of Erasistratus, the *corpuscularian* doctrine of Asclepiades, the *humoral* doctrines of Galen and his followers, the *chemical* principles of Paracelsus and succeeding chemists; the *lentor* and *obstruction* of the mechanical sect, the *laxity* of Cole, &c. Others take up some one prominent and conspicuous symptom, and consider it as constituting the primary and essential part of the disease; such as the excess of heat, the profuse secretion of bile, the spasmodic constriction of the skin, or the

debility, or, rather, inability for muscular exertion: all of which are effects or consequences only, and not primary links in the chain of phenomena of fever.

There is scarcely any part of the body which has not been assigned, by one writer or another, as the seat of fever. As long as the *humoral* pathology kept possession of the schools, the blood and other fluids were accused as the fundamental seat of fever; some imaginary *lensor* impeding its free transmission, or *acrimony* vellicating the nervous fibres, and stimulating them into inordinate action; or something equally wild, and beyond the regions of sense, being considered as the immediate exciting cause of all the phenomena.

Van Swieten, after Boerhaave, calls fever “*morbis cordis**.” Willis defines it, “*motus inordinatus sanguinis, ejusque nimia effervescencia;*” and he compares this state of effervescence to the fermentation of vinous liquors †.

* Com. in Aph. 573.

† De Feb., cap. 2.

This appears likewise to have been the opinion of Sydenham, who talks a great deal of this supposed fermentation *depurating* the blood from noxious matters, and of discharging them by the different emunctories, as the chief intention of nature in the production of fevers; an intention which was to be seconded, not counteracted, by the physician.—Morton, the great cotemporary and rival of Sydenham, entertained the same general notion, as to the immediate exciting cause of fever; “deleterium quid in spirituum systemate delitescens,” occasioning effervescence and expansion of the blood; they differed widely, however, as to the means of *exorcising* and expelling this turbulent spirit*.—Boerhaave blended this doctrine with the notion of *lentor*, which, of course, furnished a new indication of cure.—Stoll derives fever “ab irritabilitate cordis et arteriarum aucta et exstimulata†.”—Baglivi considers the mesentery as a frequent seat of fever;—Sylvius, the

* *Pyretologia* Mortoni. *Exerc. Prim.*, cap. 1.

† Aph. 6. *De Cogn. et Cur. Morb.*

pancreas;—others, the *primæ viæ*. In fact, there is no end to the speculations that have been made on the subject.

The unsatisfactory nature of the various theories thus proposed, and their manifest insufficiency to explain the numerous and diversified phenomena of the disease, have led many modern writers to reject them altogether, and indeed almost to question the possibility of any satisfactory solution of the difficulty being given.

Selle, in his *Rudimenta Pyretologiæ*, says, “with regard to the absolute nature of fever, as the source from which all the phenomena spring, authors are not agreed; nor shall I pretend to penetrate so obscure a subject*.”—“The genuine nature of fever,” Lieutaud observes, “is involved in the greatest mystery; nor perhaps are its varieties better under-

* “Quod autem ad absolutam febris naturam attinet; quæ quidem sub omnibus febrim considerandi et denominandi modis et semper tanquam primum fundamentum, ex quo omnia phenomena consequuntur, competit, de ea auctores non conveniunt; nec ego has tenebras penetrare audeo.”—*Rud. Pyret.*, 8vo. p. 93. ed. 3. 1789.—Berol.

stood *.” Burserius gives his opinion, that no *proximate cause* of fever can be laid down that shall embrace all its varieties. “What the real derangement in the system is, which produces the external appearances in fever,” says Dr. Fordyce, “is not at all known; it is a disease, the essence of which is not understood †.”—Dr. Jackson, in his *Treatise on the Fevers of Jamaica* (p. 109.), observes, that “the symptoms of fever are undoubtedly indications of a derangement of the body from its healthy state; but when we have said this, we can say no more. The nature of the derangement which, in its first beginning, is not obvious to the senses, neither the ancients nor the writers of the present age have, as yet, been able to ascertain.” And he elsewhere remarks, that “the *proximate cause* of fever is a subject of a dark nature. It is such, perhaps, as our limited capacities will never develope ‡.”

* “In Cimmeriis latet tenebris genuina febris indoles; nec forte dilucidius patent ejus differentiae.”—Lieutaud, *Syn. Univ.*, sect. 1.

† Fordyce, *First Diss. on Fever*, p. 118.

‡ *Essay on Fevers*, cap. 8.

All authors almost have noticed the affection of the *nervous system*, among the leading phenomena of fever. Huxham, though a rigid humoral pathologist, observes, "that contagion seems to affect not only the blood, but *primarily* also the *animal spirits*: I think the sudden damp, weakness, tremblings, and great dejection of spirits at the very attack, evidently shew it*." Dr. Cullen makes much use of the *nervous system*, in his explanation of the phenomena of fever, supposing the remote causes to act on this system generally, and upon the brain as a part of it; though he by no means looks on fever as a *topical* affection of this organ, but only that the brain suffers in common with the rest of the *nervous system*: still less does he refer it to inflammation, or an excited state of the brain, but to the reverse, viz., a state of *collapse* or *debility*. It is plain, however, that an affection or disturbance of the whole *nervous system* is, without difficulty, referable to a *topical* disordered state of the brain itself.

The Danish professor Tode, in an *Inaugural*

* *Treatise on the Fevers of Jamaica*, p. 133.

Dissertation, published at Copenhagen, in the year 1769*, a work quoted by Burserius, but which I have not seen, is much more pointed, in accusing the brain as the seat of fever; ascribing the disease to an *irritation* of this organ. If the stimulus producing the *irritation* finds nature ready and disposed for action, *inflammatory* fever, he says, arises; but if the stimulus, either from the violence of the disease, or the debility of nature, be in some measure blunted, then the fever is of a *putrid* kind—these, he says, are the only essential varieties of fever. According to him, therefore, the *proximate cause* of fever, is some kind of *irritation* of the *sensorium*, communicated in different ways to all the other parts of the body; not arising in the heart, nor in the small vessels, nor in the membranes, nor branches of nerves; but in the *meditullium* of the brain itself, and propagated from thence to other parts. This idea is objected to by Burserius, and treated by him with very little respect; but, as it appears to me, without sufficient reason. “No person in his

* *Specimen Inaugurale de duplici febrium indole.*

senses," says Burserius, "can give his assent to this opinion of Tode. For who is so dull as not immediately to perceive that, where the *sensorium commune* is irritated, as he supposes, a derangement of all the ideas and powers of the mind, spasms, convulsions, and pains, ought to be excited, rather than febrile motions?" We have, however, indubitable proof, in the case of *hydrocephalus*, that inflammation (or *irritation*, as Tode calls it) of the brain, may exist without either spasms, convulsions, or any great derangement of the mental powers; although there is at all times sufficient evidence, both in *hydrocephalus* and fever, to shew that the brain is labouring under disease.

Authors, in general, though they have not expressly said, nor perhaps thought, that the brain itself was *primarily* and essentially diseased in fever, scarcely ever fail to include the disturbance of its functions, by one expression or another, in the general character of the disease. Thus Hoffman says, "*meâ sententiâ, febres referri mereantur ad adfectus generis nervosi.*" and Boerhaave, and after him Van Swi-

eten, were of opinion, that the *proximate cause* of *intermitting* fever consists in a viscosity of the arterial blood, "and perhaps also a *sluggishness of the nervous fluid* destined to go to the heart." In the same light are to be considered the *semper virium prostratio* major quam a virium vitalium gradu foret expectandum' of Sauvages; the "*corporis gravitas*," of Vogel; the "*virium artuum summa prostratio*" of Sagar; the "*vires imminutæ*," and the "*sensorii functiones turbatæ*" of Cullen, &c. &c., all of them indications of a derangement of the peculiar functions of the brain, and, of course, arguing a disordered state of this organ. I do not see, indeed, how the alleged disturbance of the *animal spirits*, the *sluggishness of the nervous fluid*, the *weakened nervous energy*, and the like figurative expressions, are to be otherwise understood, than as referring to the state of the brain or *common sensory*.

Particular forms and states of fever have often been referred by writers to the brain, as their seat and origin. Hippocrates looked upon the brain to be the focus of *ardent* fever. And

Lieutaud says, "that *malignant* fever seems, beyond controversy, to have its chief seat in the brain and nerves, the functions of which, as long as the fever subsists, are never regularly performed. "It is in this point of view only," he observes, "that *malignant* fevers can be distinguished from others *." Upon this, it may be remarked, that although the functions of the brain are considerably more disordered in *malignant*, than in other fevers, it points to no essential difference between them, but only marks a greater degree of *topical* affection. We have already seen that the true *pathognomonic* symptoms of every fever, even of the mildest kind, are referable to a disordered state of the *sensorium* as their source.

I have lately been much gratified by the perusal of a pamphlet on the subject of fever, published upwards of twenty years ago, and which seems to have attracted less notice than

* "Ultra omnem dubii controversiam positum esse videtur, febrem malignam præcipuam sedem habere in cerebro et nervis : quorum munia, hac vigente, nusquam lucida perstant, nec sub alio conspectu a cæteris febribus ritè distinguì potest."—*Prax. Med.*, lib. 1. sect 1.

it merits*. In this the author ascribes the principal phenomena of fever to a *congestion* of blood within the head. His idea is, that the proximate causes of *epilepsy* and of *fever* are nearly the same. With Dr. Cullen, the author refers the remote causes of fever to only two sources, *human effluvia* and *marsh miasmata*: “these,” he supposes, “are received into the circulation by the lungs, or some other channel, and there prove a stimulus to our vessels, but more especially to those of the seat and source of sensation, the brain; in consequence of which, the action of those vessels is increased, a greater than their natural proportion of blood is induced into them, which proportion continuing to increase as long as the stimulus continues to operate, at length arrives at such a height, as materially to interrupt the functions of the brain, and the due distribution of the nervous influence. In this state, to preserve an organ so essential to life, some effort be-

* *Medical Sketches*, Part 1. By Richard Pew, Member of the Royal Medical Society, Edinburgh: 8vo. 1785. Bew, London. Dr. Pew now resides at Sherborne, in Dorsetshire.

comes necessary to remove the impediment; and this effort beginning with a shivering fit, constitutes what physicians have agreed to call fever*.”

That the *congestion* here contended for by Dr. Pew actually takes place in fever, cannot, I think, be questioned: all the phenomena of the disease evidently shew it. And that such congestion is of an active kind, and induced by an inflammatory mode of acting in the vessels of the brain, appears from the increased action of all the arteries going to the head, as well as from the heat and the throbbing of the part itself and its vessels; and more clearly still by the disease so often terminating in a destruction of the organization of the brain, as proved by the dissections above referred to. Whether the author is right in his explanation of the mode of acting of the remote causes, may be disputed, for the reasons already given. Many of the exciting causes of fever are either of an immaterial kind, or evidently act without being taken into the system†.

* Pp. 102, 103.

† See p. 139.

In fever, the laws of acting of almost the whole system are manifestly changed from the healthy state; hence proceeds the disturbance of so many of its functions, from the mere agency of the ordinary stimuli. This it was natural to expect, from a change in the condition of the brain, upon the state of which all the functions so materially depend. Dr. Wilson (now Dr. A. P. Wilson Philip), the latest systematic writer on the subject, to whom we are indebted for a very minute and accurate history of fever and its varieties, considers this change in the laws of action, or of excitability, as he terms it, which takes place in fever, as the *proximate cause* of the disease: but “how the remote causes act in inducing it, and on what change in the living solid such a change in the laws of excitability depends, we neither can,” he thinks, “nor ever shall, perhaps, be able to determine*.”

This difficulty arises, as it appears to me, from not distinguishing sufficiently between the *primary* and *secondary* symptoms of the disease.

* *Treatise on Febrile Diseases, &c.*, by A. P. Wilson, M. D. 8vo. 1799. Vol. 1. p. 530.

If the general affection of the system in fever be, as I have endeavoured to shew above, only symptomatic of a *topical* affection of the *sensorium*, the difficulty in a great measure vanishes : we must no longer, with Dr. Wilson Philip, and the generality of authors, look upon fever as an *universal* disease*, however numerous and diversified its symptoms. This very diversity of character, indeed, affords to my mind one of the strongest arguments in favour of the doctrine I am contending for ; since no affection of any organ or part of the body, other than the brain, could influence so materially the principles of action in the system, or excite so general a disturbance of its functions.

The only other author I shall quote on this occasion, is the late Dr. Home, of Edinburgh, who describes with great minuteness, the symptoms of a low nervous fever, as occurring in his own person, and in which his feelings, as well as the effects of remedies and other circumstan-

* “ Simple fever,” says Dr. Wilson Philip, “ is the only general disease, and may be defined, an excessive excitement or debility of all the functions, without any *local* affection.”
—*Treatise on Febrile Diseases*, &c.

ces, forcibly pointed out to him the existence of inflammation in the brain, although none but the symptoms ordinarily observed in these fevers were present. The case altogether is highly interesting and instructive; I shall therefore make no apology for transcribing it.

“*June 7th.* I rose,” says Dr. Home, “with a slight *pain in my head*. Being used to the cold bath, I went in that morning, and rode about ten miles that night, pretty hard, which I perceived *hurt my head* very much: that night I had a grewing. Next day I had a *severe headache*, and quick pulse: on the 9th, my *headache* was exceedingly severe.

“10th. Symptoms the same; my pulse was rather soft and weak: I was blooded, and when I had lost eight ounces, I fainted. This never happened to me before nor since, having easily borne repeated bleedings. That night my temples were shaved, and blisters, as big as the palm of my hand, laid to them.

“11th. Next morning, the pain gave me no great trouble, but a *giddiness* remained. My eye-balls, on being pressed, were painful, and

my eyes could not bear the least ray of light. There was no external inflammation on them; the least noise, which could scarcely have been heard at another time, gave me intolerable pain. My pulse was never above 100, and always soft and weak. I had all along a great debility and frequent sighing; my tongue was always white and moist, and no great drought. I never got passage but with an injection. The symptom which gave me the greatest uneasiness was, a *continual watchfulness*; so that, for the first eight days, I never had the least appearance of a sleep; nor for the six following days, I dozed perhaps for three or four hours in the night very confusedly. This night my whole head was blistered; this relieved my head considerably, especially as it run plentifully for eight or nine days.

“12th. The same: this fever had the appearance of a *nervous fever*, in all its symptoms; therefore was ordered *Emuls. camph. coch. 1. tertia quaque hora*. I threw up a part of the first dose, but what remained sweated me four hours. During that time I was vastly uneasy

and almost delirious, and therefore would take no more.

“13th. Much the same; head quite distinct. As I had got no sleep for many nights, R. *Pulv. castor. gr. xv. mucilag. g. tragacanth. q. s. ut f. bol. cap. h. s*—R. *Sal. absynth. ℥ij. succ. limon. ʒj. aq. fontan. ʒiij. sacch. alb. ʒj. M.* Poultices were applied to my feet: I sweated two or three hours, but was very uneasy, and slept none.

“14th. I got up this morning to change my bed on account of noise; and without having the least nausea, or sign of foul stomach, I threw up a good deal of bile, and afterwards assisted it by drinking warm water. I took a vomit of *tinct. ipecac.*, which came off immediately, without producing any previous sickness. It gave me one loose stool, which relieved my head considerably. R. *Bol. ex castor., addend. sal. absynth. gr. v.* My head was very uneasy this night; and I was convinced that the *castor* hurt me, without giving me sleep. I felt an unusual coldness that night. The *uneasy feelings of my brain* were so strong, that I was

fully convinced my disease was an inflammation of that part; and therefore I declined all heating medicines, which I was sensible had heightened the symptoms. On the 15th, much the same, and dozed a little that night; as likewise two or three hours on the 16th. My pulse came to 94.—17th. Pulse very soft, weak, and at 90. During the few hours that I slept that night, my head was carried, and I had a slight delirium, which was owing, probably, to the little sleep which I had got of late. In the morning I was again distinct enough; my fever abated by degrees, without any visible crisis, and left me exceedingly weak about the 20th. About three days afterwards, there was a white milky substance fell to the bottom of my urine twice or thrice; but I did not then look at it as the crisis of my fever; for it came out at once with the first of my urine, and fell directly to the bottom: I rather considered it as the nutritious part of my juices, which had run off from a mere laxity of the secretory vessels, especially as I had this very symptom some years before, when reduced by a hectic fever.

“ For three weeks after the fever was gone, I felt a pain in my head when I turned it ; my eyes were sore to the touch, and objects danced before them ; my ears were sensible to the least noise ; my head was giddy, had an uneasy pulsation in it when I laid it on the pillow, and I felt an unusual heaviness in it when I was on the point of falling asleep, and after I had just awakened. For two or three days after the fever went off, I had an unusual acuteness of smell and taste, so that I felt a strong flavour from bread.

“ From considering the whole train of symptoms in this disease, it appears plainly to have been an *inflammation of the brain*, I mean of its *cortical* part ; for the *medullary* has no blood-vessels ending in it, and seems to consist alone of nervous filaments. That this was an *inflammatory* disease appeared more certainly afterwards ; for I was one night taken ill in the same manner, but more violently : I was immediately bled twice, and the symptoms soon disappeared. We may, I think, determine, that though the *pia mater* was probably affected

from its connexions with the brain, yet that the *dura mater* was not; otherwise the pulse would have been hard, which is a necessary circumstance attending the inflammation of this, and all other membranous parts. It is no wonder that the extremities of the external vessels kept open so long after the blister, considering that the circulation through the internal was stopt in some degree.

“ This fever had, however, a strong similitude to the *low nervous fever*, in the weak pulse, confusion of the head, frequent sighing, depressed spirits, and sinking under the evacuation: nothing but my own strong feelings at the time, and the increase of the symptoms afterwards by the *nervous* medicines, could have persuaded me of its being different. The weakness of the pulse was probably owing to a stoppage of the secretion of the nervous fluid in the cortical part of the brain, from an obstruction of the glands which serve for that purpose, by the turgid blood-vessels. From this case there appears a great probability, that

all *low fevers* arise from, or are attended with, an obstruction of the brain.

“ But how happened it, when the powers of *motion* and *sensation* are allowed by all to depend on the brain, nerves, and nervous fluid, that the former were so weak, and the latter so strong? Were the nerves of the eyes, ears, palate, and nose inflamed, stretched, and rendered more sensible? I think we cannot adopt that solution, as no signs of inflammation appeared in these parts. Were the nerves of these parts less compressed at their origin in the brain? Of that we have no proof. Are the powers of *motion* and *sensation* situated in different parts of the brain? I think we have facts sufficient to warrant that conclusion. *Motion* seems to arise, and be in proportion to the secretion in the *cortical* or glandular part of the brain: whereas *sensation* seems, by experiment, to have its seat in the *corpus callosum*, and must be in proportion to the tension, and other circumstances of that part, as well as the quantity of secreted fluid. Hence that part must feel more acutely, if its tension is increased in

a greater *ratio* than the nervous fluid is diminished. In the preceding case, we find the *sensation* of feeling more acute, while the effects of the *motive* powers were often more weak. The want of sleep was owing to the flux of blood to the head, a constant effect of that cause: nothing was capable of producing sleep in that situation, but what could have inverted that motion, and have turned it to the feet. An artificial inflammation excited there might, in part, have answered this end.

When such complaints first appear, bleeding is the proper remedy; after the disease is fixt, it seems rather to do harm. Frequent dry cupping on the shoulders or thighs, cannot fail to be beneficial: this application has very strong effects, and is too much neglected by modern physicians.

“The heating *nervous* medicines were found hurtful in this case *.”

This is a most interesting history, not merely in respect of its influence on the *theory* of fever, but also in the important *practical*

* *Med. Facts and Experiments*, 8vo. 1759.

rules which it suggests. Great attention, undoubtedly, is due to an opinion derived from the feelings of a person conversant with diseases and the nature of the animal economy. The sensations arising from inflammation are so strongly characterized as hardly to be mistaken, even by an uninformed patient, when once pointed out to him. It is not likely, therefore, that a physician, of great experience, should have so erred. The local pain, the throbbing felt within the head, the increased sensibility of the different organs of sense, the disturbed sleep, the derangement of the other functions of the brain, the salutary effects of bleeding and blistering, though not absolutely curative; and, on the other hand, the ill consequences experienced from heating and stimulating medicines, together with the disposition to headache, giddiness, and morbid state of sensibility, remaining for weeks after the cessation of the fever, are all circumstances which, in addition to the freedom of other organs from disease, seem to shew, in the clearest manner, the truth of Dr. Home's conjecture, that an *inflamma-*

tory action was going on in the blood-vessels of the brain. And if this be admitted with regard to the present case, I do not see how it is possible to refuse assent to the proposition, that other fevers of the same description depend on the like cause. For there was in this case nothing peculiar in the train of symptoms ; nothing to distinguish it from the whole tribe of *nervous* or *low* fevers, or which at all indicated the presence of inflammation in the brain, as an *accidental* occurrence merely. The symptoms from which Dr. Home deduced his opinion of the existence of inflammation in the brain, are present in every fever, in greater or less degree.

This case of Dr. Home has been quoted by Selle, in his *Rudimenta Pyretologiæ*, for the purpose of controverting the conclusion drawn by Dr. H., namely, that this and another similar one (which terminated fatally, and in which collections of *purulent matter* were found in the substance of each lobe of the brain, and also in the cerebellum), although they resembled very strongly the *low nervous fever*, were, in reality,

cases of *phrenitis*, or topical inflammation of the brain. "Why may not the symptoms mentioned," he asks, "be referred to mere *congestion* of blood in the superior parts of the body? The collection of *purulent matter*, observed in one instance, was rather," he thinks, "an *effect* than a *cause*, and denoted a complication of disease. Neither the habit of body of the patients, the nature of the remote and predisposing causes, nor the method of cure found best adapted to the disease, according to the experience of the most skilful practitioners, points out such a *local* cause of the fever. Who will say," he adds, "that *stimulants* and *corroborants* are proper remedies for the removal of inflammation? Yet these are the remedies which both reason and experience approve, as best adapted to the cure of this fever." He then goes on to assign some unknown *acrimony* irritating the nerves, as the *material* cause of this fever, and he gives a case which he supposes was occasioned by *arthritic acrimony*, the patient having been previously subject to gouty attacks.

These objections, made by Selle to the idea of *sensorial inflammation*, being the real cause of the symptoms in the cases alluded to, are not, as it appears to me, of any weight; while the cause assigned by himself may be rejected as entirely gratuitous, and without a shadow of proof to support it. *Inflammation* is not peculiar to the vigorous and robust, but is found occasionally in every kind of constitution: there is every reason to suppose that it is more frequent in persons of infirm habits, as such are generally more irritable, and consequently more open to the impression of morbid causes. And experience of late years has abundantly shewn, that inflammation, when it takes place in such habits, is often more successfully combated by *stimulant* and *corroborant* remedies, than by *evacuations*. No argument, therefore, against the opinion in question can be fairly drawn from this source.

That the *congestion* within the head, in Dr. Home's case, was not, as Selle supposes, simply the effect of an increased determination of blood towards the upper parts of the body, appears, I

think, from this circumstance, that the uneasy feelings in the head, and the acuteness of the senses, did not leave the patient along with the fever, but remained for some weeks after; this is quite analogous with the effects of inflammation on other organs, which, in general, do not lose their *morbid sensibility*, and return to their usual mode of acting, till after a considerable interval.

Dr. Home seems to consider as a proof that his disease was not in reality, though in appearance, the *low nervous fever*, the symptoms being aggravated by the use of stimulating *nervous* remedies. But the utility of medicines of this description, and even of wine in these fevers, stands on very questionable grounds; unless under considerable restrictions, and towards the latter periods of the disease, when the force of arterial action has declined, and some degree of stupor has succeeded to the morbid sensibility which generally prevails in the early stages. That they often produce the very inconveniences in the *low nervous fever*, which Dr. Home deprecates in his own case of

supposed *phrenitis*, I have had many opportunities of remarking, where attention was not paid to the circumstances above mentioned. And, indeed, observation has taught practitioners of the greatest experience to employ *wine* and *cordials* with a much more sparing hand at present, than was customary a few years back, when the doctrine of *debility* being the essential part of fever, was in vogue.

The same author, Dr. Home, gives us the history of an *epidemic fever* that prevailed among the British troops in Flanders, in the year 1742, and which he stiles a *slow fever**. It usually made its attack in this way:—The person lost his quickness of mind, and was very slow at giving his answers. This was so strong a diagnostic symptom, that Dr. Home knew with certainty when any one was in this fever, by the first sentence he spoke. This gradually degenerated into a stupor, without any great pain in the head; wherein he continued often for fourteen days. The usual febrile symptoms succeeded. The eyes were in a stare, and ap-

* *Med. Facts and Exp.*, 8vo. 1759.

peared very dull. The pulse did not differ so much from the healthy state, as one would have expected from the other symptoms ; being only a little quicker and lower. The patients generally complained of a great pain below the stomach. At length they voided their excrements involuntarily. A hiccup and *subsultus tendinum* often came on before death. *Blood-letting* was not practised, the pulse, *being rather weak from the beginning*, not indicating it. *Sudorifics* were useful, and particularly bathing the feet in warm water at bed-time. Of those that died, the bodies of two only were subjected to dissection. In one of them, the stomach and small intestines exhibited marks of inflammation ; but the head was not examined. In the other, sinuses full of a greenish pus, in some places of a thin, in others of a thicker consistence, were found in each lobe of the brain ; and the matter, which amounted altogether to about four ounces, had eaten its way, the author says, into the ventricles, and filled them. Some *matter* was likewise found in the cere-

bellum. The abdomen and thorax exhibited nothing unusual.

Here then is an instance of *epidemic fever*, of the *low kind*, exhibiting after death unequivocal marks of previous inflammation in the brain. But what were the symptoms in this individual case?—Were they such as to distinguish it from others of the same epidemic, indicating in a peculiar manner the presence of topical inflammation of the brain, according to the ordinary characters laid down of this disease?—by no means. “The patient had been,” Dr. Home says, “in one of these *slow fevers* for a month, and was first seized with a vomiting and purging, which yielded to a vomit and injections. He lingered in this fever, sometimes complaining of a small pain in his head, till he was sent to the hospital, where continuing two days in a low way, he was seized with slight convulsions, and expired.”—In no case of fever, probably, could there be less reason to look for disorganization of the brain, than in the one before us. No raving, nor violent pain in the head, no

redness of the eyes, not even delirium, is mentioned among the symptoms.

Dr. Home, in his comment in this case, remarks, "that if we are to judge by all the symptoms, the *brain* was the principal seat of disease: but we dare not conclude," he says, "that every brain was affected in this manner. In this case, we see the substance of the brain converted into pus (and that too of no short standing, since the sinuses were so many), without any sudden or pressing symptoms." "What shall we say," he adds, "of *matter* formed in the *cerebellum*, where the least disorder has hitherto been looked on as mortal? It overturns the doctrine of the schools:"—it certainly does so; and not only with regard to this particular point, but to the whole doctrine of fever. It proves, with others, that *inflammation* and *suppuration* may take place in the brain, with scarcely any of the symptoms commonly assigned to *phrenitis*; without any, in short, but the mildest symptoms of *idiopathic* fever. From the event of this case, it is probable that, had other dissections been made, similar ap-

pearances might have presented themselves. Yet we are not at liberty to infer, for reasons already stated*, that such would have been generally, or even frequently, the case. When, however, we consider how rarely, in comparison with the whole of fevers, the state of the brain has been examined after death; and how often, in the examinations which have been made, decided marks of *inflammation* have been perceived, a strong ground of suspicion, at least, is afforded, that the inflammation here was not merely an *accidental* occurrence, but the *primary cause* of the febrile symptoms, or rather the disease itself.

* See p. 208.

SECT. XXIII.

OF THE DIAGNOSIS OF FEVER.

UPON the principles above laid down, it is plain that the *diagnosis* of fever must be formed in a different way from what has hitherto been done by writers on methodical nosology. The disordered vascular action, and morbid excess of heat, that have in general been admitted as chiefly characteristic of the disease, afford no certain criterion by which *proper* fever can be distinguished from various other affections. This has been perceived by later nosologists; and they have accordingly found it necessary to accompany their definitions of fever with other less fallacious signs. With this view, Sauvages, to the ordinary characters of febrile affection, as increased heat and frequency of pulse, has added, "prostration of strength, greater than the state of the vital powers would seem to in-

dicare *.” Sagar’s character of fever is nearly similar; Dr. Cullen alludes to the same thing, though in a less pointed manner, and characterizes fever by the *pyrexia*, or febrile state, taking place without any *primary local* affection, with preceding *languor*, *lassitude*, and other signs of *debility*. Linnæus† and Vogel‡ define fever as consisting merely in increased *heat*, and *velocity of pulse*.

It is scarcely necessary to repeat here, that the skin and pulse in *idiopathic* fever, afford only symptoms that are common to it with many other affections, and which consequently are not *pathognomonic*.

The characters which serve especially to distinguish fever from other diseases, are to be sought for in the functions of the sensorium, the disturbed state of which furnishes the only true *diagnostic* symptoms. The general dis-

* “Semper virium prostratione majori quam a virium vitalium gradu foret expectandum.”

† “Febris dignoscitur pulsu citato.”—*Linn. vide Synop. Nos. Method. ab ill. Cullen*, tom. 2. p. 86.

‡ “Febris. Innati caloris augmentum præternaturale, cum oris siccitate et gravitate corporis.” *Ibid.* p. 147.

order of system, the *pyrexia* or febrile state, is only secondary, and as truly *symptomatic* as in ordinary inflammation. In this sense therefore there is, properly speaking, no such thing as *idiopathic* fever; that is, a primary febrile state of body, independent of topical inflammation. Until this however is generally admitted, the term, *idiopathic fever*, as serving to distinguish it from other febrile disorders, can hardly be dispensed with.

The character of fever drawn by Sauvages, in his great work on nosology, though imperfect, approaches the nearest perhaps to a just definition of any that has been given. His words are—"In febre, vires cordis et arteriarum multum increscunt; ast illico vires stomachi, vires artuum, vires imaginationis, et attentionis ad negotia moralia, minuuntur; venus silet"—"*cætera sensuum organa, fluido nerveo defraudantur**." In this description, the disturbance in the sensorial functions of *sensation*, *voluntary motion*, and *intellect*, is distinctly marked; though it is not true that the *organs*

* *Nosologia*, tom. 1. sect. 344

of sense are in general deprived of their energy in fever, for they are more frequently deranged in the opposite way, at least in the beginning. Nor is it always the case, that the activity of the heart and arteries is increased; since it has been shewn that the reverse of this often happens.

One very important and essential circumstance in the character of fever, has been omitted in the above, as well as most other definitions that have been given—namely, *pain in the head*. It is surprising that this symptom should not have entered into the definition of fever by nosologists. It is true, they have employed it to characterize particular species of the disease; but it belongs equally to the whole class, as much at least as pain in the chest does to pulmonary inflammation. The pain in the head in fever is not always, indeed, acute, and is apt to be obscured by the *stupor* and *insensibility* under which the patient often labours. On this account it is, that pain in the head is most complained of in the first days of the disease; for then the general sensibility is heightened. As

long as consciousness remains, some degree of uneasy feeling in the head is rarely absent ; and it is in general the chief distress of which the patient makes complaint. Le Roy held this symptom to be of such importance, that, when the pulse did not indicate the presence of fever, he turned his attention to the *headache*, which, he says, when not very manifest, may be detected by causing the patient to move about, or by moving the head itself.

The more *violent* the fever, and the more *malignant* its character, the greater is the derangement of the *sensorial functions*—they are always in a direct *ratio*, one to the other. In the least dangerous form of fever, the *synocha* of Cullen, or mild *inflammatory* species, the heat of the body is great, and the pain of the head severe, owing probably to the *sensibility* of the patient being excited beyond the degree of health ; but the *senses*, *understanding*, and *voluntary power*, are but slightly deranged—“*sensorii functiones parum turbatae**.” But in *typhus*, in which the *essential* characters of

* Culleni, *Genera Morborum*. G. 4. *Synocha*.

fever are more strongly marked, although the pulse and skin are often but little changed from the state of health, the *functions of the brain* are considerably more disordered—"sensorii functiones plurimum turbatae". While the *plague*, the most *violent* and *malignant* of fevers, is characterized by extreme *depression*; and, in some cases, an almost total *abolition* of all the *sensorial* powers. "A sudden loss of strength," Dr. Russel observes, "and disturbance of the functions attributed to the brain and heart, are reckoned, in a particular manner, symptoms belonging to the *plague*. In their highest degree, they distinguish the most fatal forms of the disease, and under different modifications adhere to all its varieties†." Again, he observes, that among the chief symptoms of the attack of *plague* are, "pain in the back and loins; an intense headache; uncommon giddiness; and a sudden loss of strength. To these *succeed* a violent fever; the eyes, soon losing their natural lustre, acquire a kind of muddi-

* Culleni, *Genera Morborum*, G. 5. *Typhus*.

† *Treatise on the Plague*, 4to. p. 88.

ness; and the countenance of the sick is ghastly and confused beyond description." In short, the marks of *disordered brain* in the worst forms of fever, are too manifest to escape detection: it is only in the milder kinds of the disease, that such a state admits of question; and even here, I think, it has been shewn, that disturbance of the *sensorial functions* is invariably present, and furnishes the only ground of discrimination between fever, strictly so called, and other diseases. The affection of the heart in the *plague*, alluded to by Dr. Russel, is not a constant symptom, as appears from the history of fever above delivered*.

In conformity, then, with the view of fever above given, we should consider it as a *topical* affection of the brain, founded in inflammation; in a word, as a variety of *phrenitis*, the essential characters of which it contains. The term *encephalitis*, as implying merely inflammation of the contents of the cranium, seems more appropriate, and is sufficiently comprehensive to embrace every variety of the disease.

* *Vide* page 63.

Must not fever, therefore, in future be removed from the class of universal diseases (if there be any such, which may be doubted*), and ranked with the PHLEGMASIÆ, or *topical* inflammations, of nosologists? Like these, its characters are to be sought in the general condition and feelings of the part affected, and in

* My chief reasons for questioning the existence of *universal diseases* as *primary* affections, are the following :—1st. Every part of the body is endowed with a peculiar kind of feeling or susceptibility, which renders it liable to be acted on by certain causes only, which have often little or no effect on other parts : this is true even of the *specific* causes of disease, as the different *morbid poisons*, the *diagnosis* of which is as much founded on the part they affect, as on any other circumstance.

2dly. An increase or diminution of action in one part of the system, is almost constantly attended with the opposite state in others; inequality of action in the system being a general character of disease. And, as a question of experience, it is only necessary to refer to what are commonly called *universal diseases*, to be convinced that, with respect to most of them, they have clearly no title to be so considered. Thus the *phlegmasiæ*, or inflammations; the *hæmorrhagiæ*; and the *profluvia*, or increased discharges, of Dr. Cullen, are all primarily and essentially *local* affections; since they often are present without any general disorder of system. And with regard to the class of fevers, strictly so called, it will be found, I think, from the history here given, that they form no real exception to the general rule.

the state of its peculiar functions. Thus, in every case of proper or *idiopathic* fever, we shall find, in addition to the ordinary *febrile* symptoms of hot skin, irritated circulation, foulness of tongue, thirst, and deficient or irregular secretions, all of which are common to fever with other inflammations—pain in the head, generally of the throbbing kind, and extending along the continuation of the brain that is lodged in the channel of the spine; increased heat of the head, easily perceived on compressing it with the hands, even though the body and extremities be cold; unusual throbbing of the arteries in the neck and temples; suffusion of the eyes; and an altered expression of features, easily perceived, but difficult to be described; together with disturbance of all the functions immediately belonging to the brain, as the *voluntary*, and *mental* powers, (both of which are always greatly weakened), and *sensation*, which at different times, and in different stages of the disease, is subject to be exalted, depressed, or otherwise depraved. If to these be added, irregularity in

regard to *sleep* and *watching*, which though common to many other diseases, belongs in a peculiar manner to the state of fever; we shall have characters always sufficient to enable us to detect the presence of *idiopathic* fever, and affording at the same time the clearest indications of its *nature* and *seat*.

SECT. XXIV.

OF THE CURE OF FEVER GENERALLY, IN RELATION TO THE FOREGOING DOCTRINE.

I AM at present to speak of the cure of fever in a general way only, and chiefly as theoretically deducible from the pathology of the disease above laid down. The treatment of the particular *varieties*, will be more fully spoken of on a future occasion.

When it is considered, that the treatment of this disease has engaged the attention of the most enlightened physicians of all ages, and that the best established practice has been rather the result of reiterated observation and experience, than the offspring of any speculations respecting its nature and origin, it is hardly to be expected that any theory, however just in its principles, will, at once, materially improve the cure of fever, or detract much from its danger and fatality. Nor is it to be expected

that, at this time of day, any new remedies can be suggested; for the whole *materia medica* has been often ransacked for the purpose. Yet it cannot be questioned, that great advantages in regard to practice must always accrue from the establishment of a just theory respecting the nature and origin of diseases. It serves to guard us against the employment of superfluous, and frequently hurtful, remedies; and if it hold out no new nor more successful means of cure, it at least teaches us a more precise and advantageous use of those already in our hands; while the want of it leaves us in doubt and uncertainty respecting the real powers and effects of remedies, and leads us often to the empirical and indiscriminate employment of those of various, and, perhaps, opposing tendencies.

This may be exemplified in inflammation of the intestinal canal, as produced by *strangulated hernia*, in comparison with *fever*. In the former case, the nature of the disease is obvious, and the proper indications of cure at once present themselves. The patient is not teased by the exhibition of numerous and frivolous re-

medies; the object aimed at, is clear and precise; the means of attaining it are simple, and their mode of acting well understood. But in *idiopathic* fever, the reverse of all this is the case. Physicians are neither agreed in regard to the nature of the affection, nor even as to its proper *seat* in the body. For want of a distinct and intelligible object in view, on the part of the practitioner, and a desire of being active, the patient is made to undergo the whole routine of medical treatment; being, in turn, *bled*, *blistered*, *vomited*, *purged*, and *sweated*; and afterwards *stimulated* in various ways; one means being resorted to after another, for little other reason, as it would seem, than because the former had failed. A recovery, no doubt, often takes place, even under these circumstances, but it is probably less to be ascribed to art than to the powers of resistance of the constitution, the *vis conservatrix naturæ*; which is often not only an overmatch for the disease, but for the treatment pursued also.

If there be any foundation for the doctrine of fever here brought forward, much of these evils

undoubtedly will be prevented. The disease may still prove difficult of cure, and, notwithstanding our best endeavours, terminate on many occasions fatally: but the *seat* and *nature* of the disease being known, the proper indications of cure will be obvious, and the means of fulfilling them simple, though not always effectual: the object of the practitioner will be clear, and his efforts at least well directed.

It is a peculiar feature of the present doctrine that it is not, as far as I am able to judge, at all at variance with any established mode of cure, the utility of which experience has fully sanctioned. The hypotheses that have from time to time prevailed with regard to the nature of fever have, almost without exception, when applied to practice, been found defective. They have either furnished indications, which have proved inadequate to the purposes of cure, or have suggested the employment of means which experience has shewn to be prejudicial. Of this, it would be easy to adduce abundant proofs. Whether we look to ancient or to modern times, we shall find reason to be convinced

that medical hypotheses have not a little tended to vitiate medical practice.

Those who believed in the existence of *lensor* and *obstruction* as the cause of fevers, naturally inclined to the copious use of *diluent*s, and of medicines supposed to be of a *resolvent* nature ; as *neutral* and *volatile* salts, and *saponaceous* compounds. Those who supposed the existence of a predominant *acidity* in fevers ; or, on the other hand, an *alkalescent* state of the fluids ; insisted, of course, upon the use of remedies of an opposite description. Those, again, who looked upon morbid *excess of heat* as the essential part of fever, should, to be consistent, have confined their attention chiefly to the means calculated to reduce this : yet it is certain that fevers are, on many occasions, best and most speedily cured by *heating* and *stimulating* remedies ; being, by these, sooner brought to a *critical* termination :—"licere febres parvas augere," says Celsus,—"*fortasse enim curationes fient ; et cum magis corpus incaluit, sequatur etiam remissio.*"

Upon the idea of *spasm* of the extreme ves-

sels being the most essential link in the chain of febrile phenomena, *antispasmodics* in general, and *nauseating doses* of antimonials in particular, have been liberally and assiduously administered. While those, again, who saw nothing but *debility* in the character of fever, have been led to the use of *opium*, *strong drinks*, and *stimulating* and *tonic* remedies, as calculated to rouse the supposed dormant energies of the system.

All these various modes of cure, with many others that might be mentioned, have been employed in the treatment of fever, and too often carried to a pernicious length. Inflammation has often been excited in the alimentary canal, by the pertinacious employment of *emetic tartar*, James's *powder*, and drastic purges;—or the patient has been *stimulated* into phrenzy and apoplexy, by the excessive use of *opium*;—or has had the powers of the system strained and ultimately exhausted, by the immoderate employment of *wine*, *spices*, *camphor*, and other heating remedies. There is reason to believe, indeed, that the practice of the most observant

and experienced, whether favourers of the theory of *spasm* and *debility*, or any other imaginary *proximate* cause, has been biassed in some degree by an attachment to particular doctrines.

The treatment of fevers in general use at present, at least in this part of the world, appears to be *palliative* rather than *radical*, and is, in principle, nearly the same with that which has been handed down to us from the days of Hippocrates. The instruments of medicine indeed, by the extension of the *materia medica* in latter ages, and the improvements that have taken place in chemistry, have undergone a material change; but the general scope and tendency of the remedies that have been employed are, in a great degree, the same. In the more *violent* forms of fever, blood-letting, sweating, purging, abstinence, cool drinks, and cool air, constitute the essential part of the treatment that has been had recourse to, both in ancient and modern times: while the *milder* forms of the disease have been left in a great measure to follow their natural course, and have generally subsided under the use of mostly

inactive remedies ; such, indeed, as have little claim in any case to the merit of having performed a cure.

But if the opinion I have been endeavouring to establish be well founded ;—if fever, as I suppose, consists essentially in topical inflammation of the brain ; it becomes a question of moment to determine, what influence such a doctrine ought to have on practice. Should we be content, as hitherto, with suffering the disease to wear itself out, after harassing the patient for two, three, or more weeks ; at the risk, all the while, of exhausting his strength by the immoderate exertions of the system, and of ruining at the same time the structure of the most important organ of the machine, and along with it, the energy of both body and mind—to say nothing of the destruction of other organs, which so frequently happens during the course of fever ? Or ought we, from the analogy of other inflammations, to interpose our efforts, and by the use of prompt and active means, endeavour to cut short the progress of the disease, and thus, in many instances, antici-

pate or prevent the most serious future mischiefs? This is a question, when we consider the almost endless varieties of fever that occur, of the most difficult nature, and one which I cannot hope to answer completely or satisfactorily. No general rule can be laid down that will apply to all cases. What may be safe and easy to accomplish on one occasion, may be hazardous and difficult on another, and quite impracticable in a third; according to time, degree, and various other circumstances. My present object is, to shew the use that has actually been made of the different means in question, in the cure of fever, with such others as experience has confirmed the utility of; and to inquire how far the result of their employment tends to confirm, or otherwise, the doctrine here contended for.

SECT. XXV.

OF BLOOD-LETTING, AS A REMEDY FOR FEVER.

ACCORDING to the idea commonly attached to inflammation of the brain, the most powerful evacuations, particularly of blood, would seem to be indicated; and the more so, from the large proportion of blood that is naturally distributed to this organ. If fever be nothing more than inflammation in the brain, why, it may be asked, is it not in all, or almost all, cases speedily and certainly cured by venesection? The answer to this will presently appear.

If, under the title of *inflammation of the brain*, we are to consider only the most violent and acute form of the disease, (that to which authors have especially given the denomination of *phrenitis*, and as it occurs in vigorous subjects,) undoubtedly it differs in many points, both in its symptoms and mode of cure, from ordinary fever. No one doubts of the propriety and

necessity of having recourse in such cases to profuse evacuations of every kind, and especially *blood-letting*; to the most rigid abstinence; and to all the other means calculated to subdue active inflammation. But it by no means follows, that because this practice is not generally applicable in the treatment of *idiopathic* fever, the disease must be of a different kind, and the doctrine, that "fever is inflammation," consequently ill-founded.

Phrenitis itself may take place under circumstances, that do not admit of blood-letting to any extent. It may arise in the most debilitated state of system; or it may have subsisted so long as to have injured the organization of the brain; or occasioned a large effusion of serum; or it may occur in the course of other diseases, that do not call for, or allow of such a remedy. The nature of the part affected by inflammation makes a material difference, also in regard to the treatment, and which difference can only be learned from experience. Thus, in *acute rheumatism* and in *erysipelas*, the inflammation is often of the most active

kind ; and the subject may be even strong, and the disease recent ; yet experience has sufficiently shewn, that *blood-letting* is both less safe and less effectual, than in inflammation of various other parts. Nor is it at all unreasonable to believe, that the brain has its peculiarities in this respect. In many states of fever, where the brain is evidently *oppressed*, the whole vascular system is in a state of great depression, as indicated by the pulse and other circumstances, as before noticed ; and it is altogether a question of experience, whether, or to what extent, in such a state of things, *blood-letting* is either safe or useful ; although in the same case, in an early stage of the disease, it might have been no less safe than effectual. The oppressed condition of the brain, manifest from the state of its functions, that takes place in the more *malignant* and advanced stages of fever, is owing principally, in my opinion, to a degree of stagnation, or impeded circulation, in the brain, the result of the excited and distended state of arteries producing compression of the veins, and thus preventing the free transmis-

sion of blood through the organ. What effect a sudden and large abstraction of blood from the general system might have in such a condition of the brain and its vessels, it would be impossible to say *à priori*: nor do I think that experience has yet sufficiently decided the point. It would be unreasonable to expect that *blood-letting* should be a universal remedy for fever, (allowing this to consist in inflammation of the brain) since it is not found to be such in any other disease; no inference, therefore, can be fairly drawn against the doctrine here maintained on this account.

Blood-letting seems in general to have been considered too much in the light of a direct and absolute remedy for inflammation; as if, by emptying the vessels and lessening distension, it acted on and removed the *immediate* or *proximate* cause of the disease, or as if it needed only to be carried far enough in order to ensure its object. This is far from a proper view of the subject, while it leads to an improper and even dangerous practice. The loss of half a pound of blood, a quantity often suffi-

cient for the cure of inflammation, can have no calculable effect in diminishing the tension of the vascular system, mechanically speaking. The vessels throughout the body are liable to far greater vicissitudes of distension and contraction, upon every partial change in the distribution of the fluids. It is in some other way therefore, and not merely by unloading the vessels, that *blood-letting* produces its good effects in the cure of inflammation. Nor is it by simply weakening the system ; for there are many inflammations that are best treated by means the reverse of this ; by remedies that give vigour to the system, and increase its activity.

Inflammation occurs as readily, generally speaking, in weak as in strong habits ; there appears even reason to believe, that the former are in some respects more disposed to it than the robust and vigorous. It seems to be a general law of the animal economy, that in proportion as the powers of the body are diminished, the susceptibility with regard to impressions, and consequently the disposition to

be thrown into irregular action, are increased. Hence weakness, though never of itself a disease, may predispose to it. But the diseases which arise under such circumstances are, in general, characterized by less activity, and go on more slowly to disorganization; and they commonly also require a less active mode of cure.

When inflammation arises in debilitated habits, it is often not only not curable by general *blood-letting* and other evacuations, if these are employed to any considerable extent, but appears even at times, to be rendered thereby more difficult of cure; and that, probably, for the reason above stated, namely, that weakening the system increases the disposition to irregular action, or predisposes to disease. The rule, however, is by no means constant, that *blood-letting* is improper as a remedy for inflammation in debilitated habits. On many such occasions, it is found to be scarcely less effectual than in a state of vigour. To determine in different cases when it may be proper or otherwise, is a difficult task, and requires

much judgment and experience on the part of the practitioner. From my own observation, I am inclined to believe, that, when properly adjusted to the actual strength of the system (a point of the first magnitude, but which has been too much overlooked *), there are few cases of inflammation that are not capable of being relieved by it, and that it may form a valuable auxiliary to other means, even to those of a *tonic* and *stimulant* nature.

This, I know, is in opposition to received opinions, and will be supposed to involve an inconsistency, namely, the recommending at once *blood-letting*, and the use of *tonic* and

* I believe that blood is often drawn in too large quantities from the sick, without sufficient attention being paid to their state of weakness at the time. When *blood-letting* is thought advisable in adults, the quantity of blood taken away is generally between six and twelve ounces. But I have observed a manifest reduction of the general strength, and a feeling of weakness, continuing for several days, induced by the loss of not more than from two to three ounces, and yet with evident relief to the disease. In such a case, it is probable that the loss of six or eight ounces, which is in general not considered as a large quantity, would do harm. The remedy itself is not always so much to be blamed, as the error in its administration.

stimulant remedies. The inconsistency, however, in this case is more apparent than real. If disease do not consist essentially in weakness simply (as has I think been clearly shewn), but in some unknown deviation from the natural and healthy mode of acting; then by possibility it may be obviated, and health restored, by remedies of either a *stimulating* or *debilitating*, nature and which have no right therefore to be set in opposition to one another on this occasion. In fact, whatever is capable of making any considerable impression on the system, or of changing its mode of acting, may become a remedy for its disorders: and hence means apparently the most opposite, are often found to remove one and the same disease. Diseases accompanied with great debility, have often been cured by loss of blood, and other evacuations; while those of an opposite character have, in many instances, yielded to the most active stimulants. A slight acquaintance with the history of physic, will serve to convince us of this. The practice of Sydenham was, in many respects, in direct opposition to that of

Morton; the one employed *bleeding*, where the other gave the most active *stimulants*; yet there can be no doubt, that they both frequently succeeded in curing their patients.

Of late, a division of inflammation has been made into two *species*, the *active* and the *passive*: the latter, being supposed to consist in a weakened action of the vessels of the inflamed part. If this be meant comparatively only, in relation merely to the more active form of the disease, it may be well founded; but if in comparison with the state of health, I believe it to be far otherwise. There is no inflammation in which there are not unequivocal marks of increased exertion in the part itself, however weak may be the general system. The phenomena are the same essentially, both in the *active* and the *indolent* forms of the disease, and differ only in degree. But a difference in degree merely, has never been allowed to constitute a diversity of *species*.

Let us take the scrophulous ophthalmia as an example. This has been called a case of *passive* inflammation, depending on debility;

not of the constitution only, but of the inflamed part itself. The phenomena are, however, quite irreconcilable with this notion. The *vascular action*, and the *sensibility* of the part, are both evidently increased. Hence the tumour, the enlargement of vessels, and consequent redness of the membranes. That these effects are not owing to *stagnation* of the fluids, and want of power in the vessels to transmit their contents, is shewn by the presence of all the marks of increased circulation, as a florid hue, augmented secretions, heightened sensibility, rendering the impression of light painful, and increased evolution of heat; and still more by the growth of new parts, as fungous excrescences *occasionally*, and new vessels *constantly*, observed. The *veins*, too, coming out of the part, are found to be enlarged, as well as the *arteries*; which is a decisive proof, that the blood is more freely transmitted through the organ. In the most acute ophthalmia, the same appearances are observed, but only in an aggravated degree.

Again; in the indolent enlargement of glands,

as in *scrophula*, (which has been called a disease of debility, though upon no foundation that I can perceive), the same *increase of vascular action*, above the standard of health, is evident—in the greater vascularity of the gland itself; in the enlargement of the veins coming out of it; in the increased sensibility of the part, above what is natural; and in the growth of new solid matter (for the enlargement is clearly not attributable solely to effusion, or to distension of vessels). To this may be added, the tendency to *suppuration*, which exists more or less in all these cases, as well as in pure phlegmon.

The mistake, for such I conceive it to be, of considering the less active kinds of inflammation to depend upon debility of the part itself, seems to have arisen from observing the success that is found to attend the use of tonic and *stimulant* remedies in such cases, in preference to *blood-letting* and similar means. The fact is not to be controverted; but the inference that has been drawn from it, is liable to objection. In medicine, the same end is often

attained by different means. If it be true, as above alleged, that a state of general debility predisposes to irregular actions, or topical disease, it should follow that exciting the general action of the system may be a probable means of taking off topical diseases. And this appears to be actually the case ; as is daily exemplified in the cure of catarrh, sore throat, and a number of other slight inflammations, by an occasional debauch, or the use of *stimulating* and heating remedies.

Topical inflammations are not only often relieved by increasing the actions of the system *generally*, but by *stimulating* applications to the part itself. These, by exciting the actions of the part still further, and perhaps also by diminishing at the same time its susceptibility with regard to the ordinary and healthful *stimuli*, seem, as it were, to induce fatigue in it ; so that when the application is withdrawn, the action falls below that which is essential to inflammation, and approaches that of health. This is well illustrated, in the case of inflammation produced by *burns* and *scalds* ; which,

in many cases, appears to be as successfully treated by *stimulants* of the most active kind, and even by heat itself, as by the application of cooling remedies, or of actual cold.

From what has been said above, it may be concluded, that *blood-letting* is not a *direct* and *absolute* remedy for inflammation, but is only useful under certain circumstances; while in others, it may be disadvantageous. Its want of success, therefore, as a general remedy for fever, is no argument that the latter is not founded in inflammation. Nevertheless, it will be found on examination, that *blood-letting* has been as often used with advantage in the treatment of *idiopathic* fever, as in most other inflammations.

There is to be observed, in the practice of all ages, a strong propensity to employ *blood-letting* in the cure of fevers. This, it is probable, arose at the first from observing the frequent cure of the disease by spontaneous hæmorrhagy, particularly from the vessels of the nose. This termination of fever was noticed

by Hippocrates, and has been remarked by all succeeding writers.

The propriety of *blood-letting* in fever, might also have been deduced from the striking analogy which could not but have been observed to exist between fever and ordinary inflammation, and which, as before remarked, is so great, as to have prevented their ever being accurately discriminated in medical writings. The most obvious characters were seen to be the same, in both; the same heat of skin, thirst, and quickness of pulse; the same tendency in both to run through certain stages, and to terminate by *critical* evacuations; while they were observed to be ushered in by a similar train of symptoms.

It was natural, therefore, that *blood-letting*, which was found to be so sovereign in the cure of most inflammations, should suggest itself as a fit remedy for fever; and its continuing to be so much employed, is a proof that it must upon the whole, have been found advantageous. That it has gone so much into disuse in modern times, is more to be ascribed to the influ-

ence of hypothesis, than to any direct experience of its ill effects. We need but to reflect on the *Stahlian* doctrine of diseases, the *spasmodic theory* of Hoffman and Cullen, and the more recent hypothesis of Brown, with the extensive influence they have all in turn had on general practice, and we shall see abundant cause for the disrepute into which blood-letting has fallen of late, without at all recurring to experience as having proved its inutility.

In the earlier ages of medicine, *blood-letting* was very generally employed in the treatment of fevers; not merely in those of the *inflammatory* kind, but equally, perhaps, in the *malignant* and *pestilential*. *Ætius* and *Galen* particularly recommend it in *pestilential* diseases, where *carbuncles* make their appearance; and, in general, in all such as were supposed to proceed from a *putrid* contamination of the fluids*. *Celsus* calls it "*optimum remedium*," in *pestilential* fevers; but subjoins—"si vires sinunt, præcipueque cum ardore febris est." In the cure of the *semi-tertian*, he advises *blood-letting* as the

* *Galen, Meth. Med., lib. 12. cap. 15.*

first remedy, provided no strong contra-indication exists—"nisi magnopere aliqua res prohibet, inter initia sanguis mitti debet. (1) *"

Oribasius, a writer of the fourth century, in his book *De crurum Scarificatione*, says, he was himself attacked by a fever of the *pestilential remittent* kind, which had raged with much violence in Asia, and destroyed great numbers; he was cured by the loss of two pounds of blood taken from the leg: he adds, that in many others the disease was prevented by the same remedy, and that those who were bled freely, in general recovered (2).—Alexander, of Tralles, likewise employed this remedy in fever; as did the Arabian physicians in general (3). Ballonius (4) and Septalius (5) also recommend it.

* (1) Celsus, *De Medicina*, lib. 3. cap. 7—ibid. cap. 8—

(2) "Et sane dum pestilentia vehemens Asiam deprehendisset, multosque perdidisset, meque etiam morbus attigisset, secundo morbi die, remissione febris facta, crus, scarificavi, duasque fere sanguinis libras detraxi, hacque de causa periculum vitavi. Plerique etiam alii, hoc præsidio usi, superstites evasere; erant enim plenitudine signa: illique præcipue survabantur, qui sanguinem copiose exhauriebant." Oribasius, *De crurum Scarificatione*, cap. 28.—(3) Alex. Trallian, *De Arte Med.*, lib. 12. cap. 2.—(4) Ballonius, *Epidem.*, lib. 1.—(5) Septalius, *Lybyrinth, Med. Extricat.*—

Prosper Alpinus says, the Egyptians let blood in all *putrid* diseases.

Hoffman, though generally averse to *bleeding* in fevers of the *pestilential* or *petechial* kind, admits it may be requisite when *putridity* in fevers arises from, or is accompanied with, *plethora*.⁽⁶⁾ Tissot approves of it when inflammation arises in the course of putrid fever; as does Baldinger⁽⁷⁾.—Quarin also admits its use under similar circumstances⁽⁸⁾. Hasenohrl considers it as necessary in *petechial* fevers. In these fevers, he says, the blood often shews the *buffy* coat on its surface, though in some it is fluid and dissolved from the beginning. De Haen also remarks, that the inflammatory crust on the blood in *petechial* fever became firmer after bleeding. Dr. Mead observes, that the treatment of fever in general is to be begun by *blood-letting*, even although the pulse might not seem to indicate it.

Willis reckons *blood-letting* among the necessary remedies of fever in general, but insists at

⁽⁶⁾ Hoffman. *Op.*, 4to, tom. 6. p. 240.—⁽⁷⁾ Baldinger, *De Feb. Acut. Therap.*, p. 81.—⁽⁸⁾ Quarin, *Meth. Med. Feb.* p. 43.

the same time upon its early administration; and says, that without attention to this, both bleeding and other evacuations are not only of little use, but may even do harm—"vomitus autem, purgatio, et venesection, nisi ab initio statim celebrantur, parum opis præstant, imo sæpius obesse solent *." He employed this remedy in various species of fever, both *intermittent* and *continued*, with marked success. In the *tertian* form of fever, he bled the patient during the *intermission*, and then purged him: and some hours before the next fit was expected, he applied *epithems* to the wrist, and bled him again to the amount of six ounces; from which time, he observes, the fit did not return. In the *ephemera*, and in the *synochus non putrida* or simple *inflammatory* fever, he advises *blood-letting*, abstinence, and cooling drinks, lest the disease should degenerate into the *putrid kind* †.—This shews him to have been aware that *putridity* was no essential part of the character of fever, but the consequence rather of violent action in the system. In this

* *De Febribus*, cap. 4.

† *Ibid.*, cap. 8.

form of fever, the *synochus putrida*, the importance of *blood-letting* is more strongly insisted upon, but limited to the first stage of the disease, which, he says, may continue from one or two, to six or seven days, according to the age and habit of the patient. By this practice, the further increase of the disease was prevented, and the fever, as it were, crushed in the egg—"majora morbi incrementa præcaveri, febremque velut in ovo necari." *cap.* 9. Even in the *second* stage, the use of *blood-letting* is inculcated, if the vascular action is strong and violent, and if constant watching, delirium, or intense pain in the head, are at the same time complained of.

Baglivi observes, that experience taught him to begin the cure of all fevers by *bleeding*; and that he had very frequently remarked that a sweat followed, with relief to the patient *. He observes further, with regard to some *malignant* fevers which occurred in the Hospital at Rome, that, when blood was taken from the arm, the patient grew worse, and the disease

* *Praxis Medica*, lib. 6. cap. 13.

flew to the brain, producing delirium, stupor, &c.; but that when the veins of the foot were opened, he was relieved by the operation.

Huxham, an authority of great weight in every thing that regards practice, is particular in remarking, that the apparent contra-indication to *blood-letting*, arising from the weakness and depression observable in *malignant* and *pestilential* fevers, is not to be attended to. "These fevers," he observes, "at their onset, greatly sink the spirits, and cause surprising and sudden weakness, especially when from *contagion*; yet *bleeding* to some degree is most commonly requisite, nay necessary, in the strong and plethoric, &c."—"this, therefore, when necessary, should be done as early as possible"—"a quick, tense pulse, sharp heat, great difficulty of breathing, and violent pain in the head and back, evidently demand it*." He remarks that fevers, which, during their course, assume an appearance of the greatest *malignity*, are often in the beginning attended with marks of the most active inflammation. "I have very

* *Essay on Fevers*, 8vo. p. 105.

frequently," he observes, "met with a buffy or sizy appearance of the blood in the beginning of *malignant* fevers; and yet blood drawn two or three days after from the very same persons, hath been quite loose, dissolved, and sanious, as it were *." And he quotes the practice of the French surgeons among the prisoners at Plymouth, who bled their patients every day, as a matter of course, in those fevers: when it was observed that a buff on the blood in the first days of the disease was very common, but afterwards disappeared.

Van Swieten was well acquainted with the power of *blood-letting* to cut short fever at its commencement, as well as other inflammations; a practice that he quotes from Galen, who carried it so far as to induce fainting †.

Sir John Pringle, in the *hospital* fever, in the

* *Essay on Fevers*, p. 288.

† Van Swieten in *Aph.* 54. "Docet hoc evidenter venesection, quæ furem in morbis acutis nimio impetu vitam sic potest compescere, ut incipiant omnia remittere, languere; imo ad animi deliquium deducta hac evacuatione in acutis continuis, ubi validæ ægrotantis vires sunt, sæpè illico tollitur febris; ut Galeno, sic febrem curanti, adstantium quis dixerit: 'O homo! jugulasti febrem!'"

year 1757, first *blooded* his patient, then purged him, and afterwards gave twice a-day a grain of *emetic tartar* to those that were not in the *low* state of fever, but complained much of headache, costiveness, and disorder at the stomach. All who were treated in this manner, he says, recovered. His testimony in favour of *blood-letting* in the *camp remitting fever*, is likewise very strong. The *remissions*, he observes, usually appear from the beginning, especially if the patient is *blooded* in the first attack. He was accustomed to bleed his patients in the *exacerbations* of the fever, contrary to the old doctrine.

“Copious, or what is deemed by most persons to be profuse *bleeding*,” says Dr. Jackson, “often arrests the progress of *continued* fever at one stroke: it rarely fails of entirely changing its condition, if the circumstances be proper in themselves, and if the process be judiciously conducted in practice.” “Time and circumstance are here every thing. *Bleeding*, which is decisive of cure as employed in the early

stages of several fevers, is only temporizing in the latter periods of any *."

In the fever which, at different periods, but especially of late years, has committed such devastation in America and the West Indies, the evidence in favour of *blood-letting* is of the strongest kind. While the *yellow fever* prevailed at Baltimore, in 1794, *blood-letting* was had recourse to by Dr. Drysdale, with the most decided advantage. The effects obtained from it appear highly illustrative, both of the *seat* and *nature* of the disease. Dr. Drysdale remarks of the pulse in this fever, that when it was very frequent, *venesection* rendered it more slow; when very slow, it gave it frequency; and when depressed and small, it gave it fullness †.—The same it may be proper to add, was remarked by Sir John Pringle, in the *remittent fever*; and in dysentery combined with fever, by Dr. Donald Monro ‡.

* *Syst. of Med. Arrang. for Armies*, by Robert Jackson, M.D. p. 209.

† See *Philadelphia Medical Museum*, by Dr. Coxe, Vol. i. No. 3.

‡ *Diseases of the Army*, p. 181, 185.

Venesection, Dr. Drysdale observes, removed the delirium and comatose state; and, on the other hand, where there was great watchfulness, it acted like an anodyne. It disposed to a lax state of the bowels; it checked vomiting and hiccup; it induced perspiration; and, by removing a sense of oppression, gave apparent strength and vigour. It was observed to make the dilated pupil contract, and abated the universal pains. It is scarcely possible, perhaps, to afford a more striking exemplification of the truth of the Hippocratic maxim, "that the nature of a disease is known by its remedies," than is here given. The symptoms mentioned can only be referred to the disordered state of the brain, while their speedy relief by *blood-letting*, renders it highly probable that they were founded in inflammatory action.

These are a few only of the authorities that might be cited in favour of *blood-letting*, as a general remedy for fever. Others of no less weight will be adduced hereafter, with regard to its effects in particular species of the disease.

It is not, however, to be supposed that physicians are unanimous, or ever have been so, in commendation of this practice. In all ages, *blood-letting* has met with opponents, and at present, in this country at least, is almost entirely gone into disuse in the treatment of fever *. The symptoms of increased vascular action, so common at the beginning of fevers, and which formerly afforded an irresistible motive for the use of the lancet, are now of no weight with us. We are taught to disregard the violence of arterial action, as a state necessarily of short duration, and which, must inevitably terminate in succeeding collapse or debility, (the *typhoid state*, as it is called) the condition, it seems, that we are alone to dread. But it should be kept in mind, that the latter is dependent on the former, as an effect on its

* I have had the satisfaction of observing, that, since the former edition of this work, a remarkable change has taken place in general practice, in regard to the employment of *blood-letting*, in the cure of fever; as may be seen more particularly, on referring to my account of the epidemic fever that has prevailed of late years, not only in the metropolis, but throughout the kingdom; as well as to the writings of other authors on the subject.

cause ; that if the violent excitement, which takes place almost universally in the beginning of *malignant* fevers, can be checked or prevented by any means, the symptoms of *malignity*, the *petechiæ*, *vibices*, *hæmorrhages*, and *gangrene* of internal organs, rarely appear. It is during the active state of the disease, while the vascular action is in excess, that the foundation is laid for such consequences.

The objections that have been made to *blood-letting* in fever, appear to have their foundation in opinion, rather than observation ; and were it otherwise, negative testimony cannot justly be opposed to positive facts. Were the practice of *blood-letting* really found in many cases to be ineffectual, and on some occasions, injurious, as is no doubt the case, it would only lead to a suspicion that the circumstances under which it was applied were different, and that sufficient discrimination had not been made between the various causes that may render the practice salutary or otherwise.

An opposition to the practice, from its disagreeing with any preconceived opinions as to

the nature or *proximate cause* of the disease, merits little consideration. It has been clearly shewn, I think, that the debility or prostration of strength, together with the signs of *malignity* which often manifest themselves during the progress of fever, are *consequences* merely, not *essential* parts of the disease; and may in general be prevented, by whatever is capable of checking the violence of the fever at its commencement, whether *blood-letting*, or any other means.

The objections made to *blood-letting* have been of the most absurd kind. Van Helmont and his followers rejected it altogether; no doubt because they could not reconcile it to their *chemical* notions of disease. This objection is just as well founded as that of Chrysippus, Strato, and some others mentioned by Galen, who condemned *venesection* because it is difficult to distinguish a vein from an artery, and from the danger of opening the latter instead of the former!

One of the latest writers on the subject, and who, from his rank and office of a teacher, must

be supposed to speak the opinion of a large portion of the Faculty in Europe, I mean Burserius, employs language scarcely less absurd. Treating of the *putrid synochus**, he admits that “the quantity, heat, and quickened motion of the blood, the inflammatory diathesis, and consequent danger of inflammation, require repeated bleeding. The ancients, he says, “relied so much upon it, as to prescribe it in order to remove slight delirium : and they used to perform the rest of the cure by means of *diluents* and *refrigerants*.” Burserius, however, is exceedingly cautious of relying upon his first impressions, even though sanctioned by the experience of the ancients ; and he qualifies the permission to bleed, and the use of the other parts of the antiphlogistic plan, by observing, “that in the letting of blood, and employment of *refrigerants*, a *certain mean* must be observed,”—and for this satisfactory reason, *that the purulent concoction, which requires a pretty brisk febrile motion, and a certain degree of heat, may not be retarded ;*” a caution to which particular

* *Institutions of the Practice of Physic*, § 267.

attention must be paid, when the fever puts on the appearance of the *ardent*, *bilious*, or *malignant* kind!—Thus is experience daily sacrificed to hypothesis; this *certain mean* and qualification, in the employment of an important and efficient remedy, is the circumstance which brings it into disgrace, and makes that appear to be hurtful, which is in reality the sheet-anchor of practice in this and a thousand other cases.

Much of the difference of opinion that has prevailed among practitioners, with regard to the propriety of *bleeding* in fever, is owing, probably, to sufficient attention not having been paid to the *period* of drawing blood. Upon this point, fever and inflammation stand on very similar grounds. When inflammation in the lungs has gone on with regularity and violence for a certain number of days, no one supposes *blood-letting* to be competent to its immediate removal. The disease then terminates by spontaneous changes; as by copious secretion from the mucous membrane, effusion into the cavities of the chest, or adhesion of the

inflamed lungs to its sides; or, on the other hand, by destruction of the natural organization of the part, ending in abscess or in *phthisis*. When such consequences have taken place, or are become imminent and inevitable, *blood-letting* is not only in general useless, but prejudicial; by preventing, in the one case, those natural processes from going on properly, which are consistent with, and necessary to the patient's safety, as copious expectoration, or adhesion; and in the other, by exhausting his strength, in fruitless attempts to remove an incurable malady. In like manner in *fever*, an evacuation that might have been proper and absolutely curative, in the first or second day of the disease, may be ineffective or injurious at a later period; as appears to be evinced by abundant evidence. Celsus says upon this point—" *Venesectio post quartum diem imbecillum reddere corpus potest, non integrum* *."

* Sanguinis mittendi opportunitas tanti sæpe momenti est, ut cum evacuatio hæc uno tempore prosit, in alio quodam summè officiat.—Willis *Pharm. Rational.*, p. II. c. i. sect. iii. § 34. The same author remarks elsewhere—In febre ardente, pleuritide, peripneumonia, phrenitide, apo-

Dr. Russel remarks of the *plague*, that, “in regard to evacuations in this disease, it seemed to me, from the most impartial and attentive observation I was capable of, that very plentiful *bleeding* in the beginning of the disease was of great service, *but was always prejudicial after the first day**. The same remark has been made by others.

Dr. Mitchell, describing the *yellow fever* as it prevailed in Virginia, in the years 1741 and 1742, says: “the following seemed to be the only effectual *prophylactic* I ever knew tried, and which proved effectual in fifteen in one family, where none escaped without some preservative or other; and wherever it was duly complied with, the good effects of it were very evident. I observed, that, before the fever formed itself, the sure sign of a received infection, ready to display its tragical effects, was a *sudden and unusual pain in the head*, generally

plexia, aliisque magnis morbis a sanguinis turgescencia aut incursu oriundis, phlebotomia diminuta, semper plus officit quam prodest. *Ibid.* § 29.

* *Treatise on the Plague*, 4to. p. 137.

above one or both eyes, which in some remitted with short intervals, and caused a giddiness or vertigo, rather than sharp pain, attended with an unusual feebleness and languor of the body and often a sickness at the stomach: these complaints, I observed, were little regarded by people till the fever seized them, very often all of a sudden, a few hours afterwards. Upon the first complaint of this pain of the head, they had six or eight ounces of blood taken from the arm. Some fell into large sweats or plentiful breathings soon after bleeding, by which their disorders went off; but those that did not sweat, and their complaints continued, took a vomit of *ipecac.* soon after bleeding, and, the night after the vomit, fell into the like sweats, by the plentiful use of tepid diluents and warm covering. After these applications, *the distemper never formed itself*, as it *ever did* when these complaints were neglected; although many had a brisk acute fever after or in the time of their administration, for the space of twelve or twenty-four hours, of the same nature with this fever when once formed; and all were more or

less feverish in the time of their sweats, which however went off with them, and never returned. In all those that were bled, even in these circumstances, the blood was thin, watery, and seemingly dissolved, and that in winter; a thing very uncommon at that time of year in Virginia*.”

Dr. Drysdale, in the work quoted above, remarks upon this point, that *bleeding*, when used quickly after the attack, brought the fever to a close on the first or second day in a variety of instances. In some, he says, the disease disappeared almost immediately. *Bleeding* seldom proved serviceable after the third day. The blood during the state of oppression, and in the first bleeding, sometimes appeared dissolved; but in succeeding bleedings, it was often found to have acquired a firm consistence.

Dr. Rush, in his description of the fever which raged with so much violence at Philadelphia, in 1797, (p. 125.) remarks, that during the existence of the premonitory symptoms, and before patients were confined to their rooms, a

* See *Philadelphia Medical Museum*, No. 1.

gentle purge, or the loss of a few ounces of blood, in many hundred instances prevented the formation of the fever. He did not meet, he says, with a single exception to this remark. He observes, that the mind was seldom affected by delirium after the loss of blood, and that, when *blood-letting* had not been used, patients frequently died with *convulsions*. One lady, he remarks, was so weak in her vision, that she hardly knew her friends at her bed-side. This alarming symptom suddenly yielded to the loss of four ounces of blood. "I began the cure," he adds, "in most cases by *bleeding*, when I was called on the first day of the disease, and was happy in observing its usual salutary effects in its early stage. On the second day it frequently failed of doing service, and on the subsequent days of the fever I believe it often did harm."—P. 106.

He adduces a striking instance of the preventive power of *blood-letting* and abstinence, that was communicated to him by Dr. Borland, of the British Military Hospitals in the West Indies. "In the beginning of August 1797, one

hundred and nine Dutch artillery-men arrived at Port-au-Prince, in the island of St. Domingo, in the Bangalore transport. The florid appearance of the men, their heavy cumbersome clothing, and the season of the year, seemed all unfavourable omens of the melancholy fate we presumed awaited them. It was, however, thought a favourable opportunity by Dr. Jackson and myself, to try what could be done in warding off the fever. It was accordingly suggested to Mons. Conturier, the chief surgeon of the foreign troops and the surgeon to the regiment, that the whole detachment should be blooded freely, and that, the morning after, a dose of physic should be administered to every man. This was implicitly complied with in a day or two after, and at this moment in which I write, although a period of four months has elapsed, but two of that detachment have died, one of whom was in a dangerous state when he landed: a success unparalleled during the war, in St. Domingo. It is true, several have been attacked with the disease; but in those the symptoms were less violent, and readily sub-

sided by the early use of the lancet. The crew of the *Bangalore*, on her arrival at Port-au-Prince, consisted of twenty-eight men. With them, no preventive plan was followed; in a very few weeks eight died, and at present, of the original number but fourteen remained."

It appears probable, also, that much of the success derivable from *blood-letting* as a remedy for fever, depends upon the quantity as well as the earliness of the evacuation. Sydenham, who had much experience of the effects of *bleeding* in the treatment of fever, and who reckoned it among the most powerful of remedies in this case, observed it to be injurious when not carried to a sufficient length. He does not wonder, he says, that it should fail when sparingly employed, or late in the disease, after the *petechial* tumours shewed themselves; for, when only a small quantity of blood is taken away, the business is taken out of Nature's hands while she is exerting all her powers in protruding them, and no other efficacious means are substituted for evacuating the mor-

bific matter*. He quotes a long passage on the subject from Botallus, who laid the whole stress of the cure in this case on large and repeated bleeding. Botallus says, he was confirmed in the propriety of this practice by fifteen years constant experience. He, equally with Sydenham, disapproves of half measures; and asks, whether it is matter of wonder that a patient should die under the loss of a single pound of blood in a disease which requires, perhaps, for its cure the loss of four pounds?—The reasoning of Sydenham upon this occasion will not gain much attention at present; but we are not entitled on this account to reject the practical fact, which, notwithstanding, might be well founded.

The quantity of blood drawn by Dr. Rush in the *Philadelphia* fever, was, in many cases, very large, and the recovery of the patients under such circumstances is an irrefragable proof of the utility of the practice. Such treatment could not have been nugatory; if wrong, it must have proved injurious, if not fatal. The

* Sydenham on the *Pestilential Fever* of 1665 and 1666.

truth of the statement is put beyond question, by reference to the names of the parties with whom the practice was adopted. A few patients, Dr. Rush says, required the loss of a hundred ounces of blood to cure them. And even more than this was taken away in many instances by others. The following physicians of Philadelphia, who adopted the practice recommended by Dr. Rush, drew the quantities of blood annexed to their respective names from the persons mentioned.

Dr. Dewees took 176 oz. from	Dr. Physic
Dr. Griffiths. 110.	Mr. S. Thompson
Dr. Stewart. 106.	Mrs. M'Phail
Dr. Cooper. 150.	Mr. David Evans
Dr. Gillespie. 103.	Himself

All the above, Dr. Rush adds, had a rapid and easy recovery, and now enjoy good health. He lost but one patient who had been the subject of early and copious *bleeding*; and his death was evidently occasioned by a supper of beef-steaks and porter, after he had exhibited the most promising signs of convalescence*.

Dr. Drysdale's rule as to quantity was, when

* *Op. cit.* p. 109.

the weather became cool, to bleed till the pulse began to lose its fulness and tension, or till the pains began to moderate. It sometimes, he observes, required twenty ounces to produce these effects. In some cases sixteen or twenty ounces were drawn every six or seven hours, till the violent symptoms abated. In one instance, sixty ounces were drawn in the space of twenty hours, with the desired effect. During the continuance of great heat in the weather, small and repeated bleedings were found more successful.

Fainting, Dr. Drysdale observes, seldom occurred from bleeding in the *yellow fever*. Weak women lost fifteen or twenty ounces, and delicate girls of nine years of age, twelve ounces or more, without inconvenience. Persons were bled without fainting in this disease, who, on former occasions, always fainted from bleeding.

No violent case, he adds, was cured by one or two bleedings; while not one patient died who was bled four or more times, but several died who were bled less frequently*. This

* *Philadelphia Medical Museum*, loc. cit.

agrees exactly with what Cleghorn remarks with regard to an epidemic pleurisy (fever complicated with inflammation of the lungs) that prevailed at Minorca *. He found, he says, that insufficient bleeding did more harm than good: he then took away thirty or forty ounces within the first three days. But this did not do. He therefore bled till the pains abated, or faintness came on, which often required the loss of sixteen, twenty, or twenty-four ounces. This was repeated in the afternoon, or the next day, if the symptoms continued violent. From forty-eight to fifty-four ounces, were often thus taken away in twenty-four hours. By these means, he says, the disease was as effectually removed as in any distemper whatever.

As the speedy and complete cure of inflammation in general, is found to depend very much upon *blood-letting* being carried to a sufficient extent, in cases where it is clearly indicated, so the same seems to hold good with regard to fever. "It was surprising to observe," says Cleghorn, in the passage alluded to above,

* *Diseases of Minorca*, p. 256.

“how quickly the sick recovered their health and strength, notwithstanding the great loss of blood they had sustained; while many, who had been bled more sparingly, continued in a languid infirm state for months, without being able to get rid of the cough and pain in the breast *.”

Similar consequences very frequently ensue in regard to *simple* fevers, when suffered to run their course, without any attempt being made to arrest their progress. Disorganization in greater or less degree (the never-failing result of violent and long continued inflammation), takes place in the brain (as in the other case in the lungs), and the organ is long afterwards incompetent to the perfect performance of its functions. Hence distressing headaches, general debility, partial paralysis, mental imbecility, with a long train of anomalous affections, unmeaningly denominated *nervous*, are the frequent consequences of fever, and often continue during life †.

* *Diseases of Minorca*, p. 282.

† “In febribus quibuscunque ferè continuis, siquando

The propriety of the evacuating practice in the fevers above described, is confirmed by the injurious effects of remedies of an opposite description, as *wine* and *opium*. Dr. Drysdale remarks, that they aggravated all the symptoms. And the same observation has been made by Wade, Moseley, and many others. Schenkus declares that wine destroyed all those who took it in the Hungarian fever, a disease of the *pestilential* kind.

From what has been now said, the conclusion, I think, is inevitable, that, whatever opinion may be formed with regard to *blood-letting* as a general remedy for fever, it is, under many circumstances of the disease, not only safe, and practicable with impunity, but proves a prompt

difficile aut imperfectè judicantur, affectus pertinaces, scil. vigiliæ, necnon deliria, tremores, motus convulsivi, et diu hærentes nervosarum partium imbecillitates sequuntur." Willis, *De Febre*, cap. 9 : and again, cap. 10, speaking of the *putrid* fever, he says, "*Sæpius observavi, quando morbus crisi non solvitur, ægroti longa ægritudine decumbunt, et motibus convulsivis et tremulis fiunt obnoxii.*" Such effects are only observed to follow fevers, not other acute disorders, and evidently depend on an imperfect performance of the *sensorial* functions.

and effectual cure ;—that, when employed in the first stage of the disease, it is often capable of obviating and preventing the symptoms of greatest danger, that are apt to arise towards the end of fevers of a *malignant* character ;—and that, on many occasions, it either prevents the action of the cause of fever on the body altogether, or renders its effects comparatively mild and free from danger. Of all this, I trust, sufficient evidence has been adduced.

The arduousness of the task, and that which demands the most serious attention of physicians, is to make the necessary discrimination, to discover the particular cases and circumstances, under which the practice may be beneficial or otherwise. This is a subject of great difficulty, and one with regard to which much remains to be done. It requires for its complete elucidation, long and assiduous observation, under every variety of circumstance and situation ; with a mind uninfluenced by prejudice, and unbiassed by preconceived opinions. It is not, indeed, the work of an individual, and hardly of an age ; and can only be accomplished

by the united and persevering efforts of the many.

It is a matter of the first importance, to discover the particular symptoms in fever, that indicate the propriety of venesection; and, on the other hand, no less so to become acquainted with the circumstances that contra-indicate its use. Are we to be guided by the appearances of general strength in the system; by the habit of body, age, or previous state of health of the patient; by the state of the pulse; or by what other circumstances? These are questions that, I fear, at present can only be imperfectly answered.

As far as can be judged from our present experience of the subject, it would seem that the most *violent** state of fever is the best adapted to this practice. We have seen that it has been employed with the greatest freedom, and the most decidedly good effects, in the *plague*

* By the term *violent* fever, I do not mean mere violence of general vascular action, but that variety of the disease in which the *pathognomonic* symptoms are most strongly marked, viz., the affection of the *sensorium* and functions immediately dependent on it.

and *pestilential fever*, and in the *camp, hospital*, and *jail fever*; in a word, in all those the fatality and violence of which have been justly stigmatized by the term *malignity*. While, by moderate bleeding, aided by an abstemious mode of living, together with the temperate use of remedies calculated to diminish the irritability of the system, and consequently to render it less obnoxious to the action of the causes of fever (such as the *Peruvian bark*, and a guarded use of *wine and alcohol*), there is reason to believe that persons living in the midst of *contagion*, may often escape its effects altogether; or where these take place, the future disease appears with mitigated symptoms, and of a benign character.

It is equally certain, from the testimony already adduced, that the prostration of strength which accompanies the first attack of these fevers, as manifested in the muscles of voluntary motion, does not contra-indicate *venesection*, if employed sufficiently early; for example, within a day or two of the attack. Nor is a strong, open, full pulse, an indispensable requi-

site, in order to warrant the practice. The action of the vascular system is sometimes depressed in diseases, as well as the *voluntary power*; the pulse then becomes low, feeble, and obscure, but rises after bleeding;—a sure indication this of the safety and propriety of the evacuation, and generally, perhaps, of the necessity of repeating it.

The heart, like other organs, derives its energy, mediately or immediately, from the brain. When the latter is in a state of morbid action, and its functions thereby in a great measure prevented from going on, it is not to be wondered at that the heart and vascular system should occasionally suffer. This probably depends in some degree on the particular part of the brain that is affected. The *cerebellum*, there is reason to believe, has a more direct influence on the heart than the *cerebrum*, which is more particularly devoted to the *organs of sense* and the muscles of *voluntary motion*.

It is in hot climates more especially, that fevers are found to assume the characters of *malignity* above mentioned. In these situations,

all inflammations run their course with rapidity and violence : whatever is to be done by art in such cases, must be done promptly and with vigour. Whether the lungs, the abdominal viscera, or *the brain in fever*, be the seat of inflammation, there is no safety but in large and speedy evacuations, both by *bleeding* and other ways.

Such violence, however, in the character of fever is not exclusively confined to inter-tropical regions. Experience has shewn, that the disease in temperate climates, when favoured by an unusually hot season, and other circumstances, preserves its *malignant* character, and calls for equally vigorous measures to suppress it. This has been the case at Gibraltar, Cadiz, and other parts of Spain situated in the Mediterranean ; and there is no reason to believe that higher latitudes are altogether exempt from fever of a dangerous form, though, in general, it shews itself with milder symptoms. Even in our own climate, fevers now and then appear with their most formidable train of symptoms ; and the experience of former times has shewn, that this would more frequently be the case, were cleanliness and ventilation less attended to.

The great and immediate relief experienced from copious *blood-letting* in the fevers above described, is only to be accounted for, as it appears to me, upon the supposition of the disease having its foundation in the most active topical inflammation. Upon every other hypothesis that has been given respecting the nature of fever, the practice seems unintelligible: upon that which I have endeavoured to support, it is easily explained; being in perfect analogy with the treatment of other inflammations.

It is a more difficult matter to determine with regard to the propriety of *blood-letting* in the *mild* form of fever, such as it commonly appears in this country at present, and perhaps in similar latitudes in general, under similar circumstances. There is nothing, it must be owned, in the ordinary character of the *typhus mitior*, or *low nervous fever*, either in regard to local pain or general febrile action, that seems imperiously to demand so active a mode of cure. In fact, so contrary is *blood-letting*, in these cases, to the ideas and practice of the gene-

rality of modern physicians, that he who should venture to propose it among the ordinary means of cure, would scarcely escape the charge of rashness. I may repeat here, however, what was remarked above, that the repugnance to *blood-letting*, which at present subsists among practitioners, is founded more in opinion than in observation. Few of those who now condemn it have had much experience, probably, of its employment, and are therefore hardly competent to decide the question.

It is natural enough, that those who consider *debility* as the essential part, or *proximate cause* of *typhus*, should look with abhorrence on a practice that so powerfully and rapidly reduces the strength of the system. But if my idea of the nature of fever be at all well founded, the matter appears in a very different light. We may without any difficulty conceive, that the disease will, in many instances, yield to *blood-letting*; while in many others, this may be a less appropriate remedy: just as happens with regard to other inflammations; which are sometimes best treated by active

evacuations, and at others by a totally opposite method of cure.

If the debility observed in what is called *typhus*, at its very commencement be, as I suppose, the consequence of topical inflammation in the brain, and not the immediate effect of the *remote* cause, then it is plain, *from theory*, that whatever is capable of relieving or diminishing the *quantum* of topical disease, is the proper remedy, whether it be a debilitating power, or act in any other way. In such case, *blood-letting*, by restoring the *source* of strength and energy, (the brain) to the proper exercise of its functions, may be said in reality to be a *strengthening* remedy: and such it actually proves to be, both in *malignant* fever, and in various topical inflammations, under which the powers of the system are depressed, or, as it were, absorbed in the affected part. The pulse in these cases, that was before small, contracted, feeble, and easily compressible, becomes, after bleeding, large, open, and strong; and the *voluntary muscles* recover a considerable degree of their former activity.

It has been said, and urged as an argument to prove that *typhus*, or low nervous fever, consists essentially in debility, that women, and, in general, the delicate and infirm, are more susceptible of the infection of these fevers, than the strong and vigorous. Of the truth of this, judging from my own observation, I am by no means convinced. One source of fallacy here has been already mentioned; viz., that such persons, from being usually employed in domestic offices about the sick, are consequently more in the way of contagion. But admitting the fact, that the feeble and debilitated are more susceptible, it is certain that the disease attacks the robust and vigorous with greater violence, and that such are more endangered by it. The prostration of strength in the latter, is at least as great as in the former. But is it conceivable that a person, who, but a few hours before, could have borne without detriment the loss of a pound or two of blood, and whom we should not hesitate to bleed to this amount in the event of his being attacked with pulmonary inflammation, or various other dis-

eases, can be brought into danger by the loss of a few ounces of blood, where there has been, in this short interval, no evacuation of any kind, nor exhaustion of the vital powers by excessive exertion?

The powers of the system in fever are in the first instance *depressed*, not absolutely weakened; like a spring which is prevented acting by a weight, but which nevertheless still retains its elasticity, ready to act when the superincumbent force is taken away. The difference between this depression of strength and absolute weakness is very obvious, and has been noticed by physicians of the best observation. It is in nothing more striking than in this respect, that depression of strength disappears at once, by the removal of the disease which occasioned it, even though this be effected by *blood-letting*, or other debilitating means; while actual weakness, as it was at the first independent of the disease, or at least only a remote consequence of it, so it remains, though the disease which it accompanies be removed.

According to the principles here advanced,

as the mild form of fever, and the more *violent* or *malignant*, differ from one another chiefly in degree, (not in their nature or seat,) it might be concluded *à priori*, that the same mode of treatment would be proper in both; with this difference, however, that while the *malignant* fever, by its rapidity and violence, demands and justifies the use of the most active means for suppressing it, the *low nervous* kind, being attended with, comparatively, but little danger, may often be safely entrusted to milder remedies, that are not so liable to abuse or misapplication.

Still it is of importance, and highly desirable to be able to assign, as far as possible, the circumstances in which a more active mode of cure ought to be employed; with the view of cutting short, or of bringing to a speedier termination, the fevers of temperate climates. It argues little in favour of our art, that a fever is suffered to run through its course of three weeks or a month of active disease, and twice as long a period of convalescence, almost without an attempt being made to arrest its pro-

gress; for the treatment of fevers at present can be considered as little better than palliative.

The chief limitations to the use of *blood-letting* in *typhus*, (supposing it to be proper) which appear to insure its safety, are the following:—*First*, that it be confined, as in *malignant* fever, to the early stage of the disease; as it is at this period that the topical affection, in all cases of inflammation, is most easily superseded and overcome: *Secondly*, that it be employed only in habits of tolerable previous strength; such, in a word, as we should not hesitate to have recourse to in *blood-letting*, in the case of their being attacked by other inflammations. Under these restrictions, and with a due regard to quantity, I venture to assert, with confidence, derived from much experience, that the practice is no less safe than effectual, and scarcely less so, indeed, than in other inflammations.

When fevers of this description occur in habits previously weak and infirm, the propriety of *blood-letting* appears doubtful; or rather would seem, at first view, to be obviously and

totally improper ; and especially as the fatality of the disease, in general, under proper management, is not so great as to justify, in the opinion of many, the employment of a remedy that, if ill applied, may be attended with dangerous consequences. Even here, however, the objection is probably rather speculative, than the result of actual experience ; for scarcely any one at present thinks of employing venesection under circumstances of this kind. We have still much to learn with regard to the effects of *blood-letting* in diseases in general. That it cannot be employed without injury, in weak habits, to the same extent as in the strong, is very manifest from experience ; but it has not been so clearly proved that it may not be an useful auxiliary, when nicely adjusted to the existing state of the system.

Where the strength of a patient is such, as not to bear the loss of six or eight ounces of blood, it is seldom thought right to prescribe venesection at all, which is in such cases almost universally deemed improper. This conclusion, however, as a general rule, appears to me to be questionable.

In a great number of diseases, it is sufficient that a change be induced in the general state and mode of acting of the system, in order to effect a cure: and this may be often accomplished by different and even opposite means, without any regard to *proximate* causes. *Blood-letting* is a remedy eminently capable of inducing such a change, and has often effected cures where, from theory, it has been supposed to be contra-indicated. Very sensible and decided effects are frequently produced by the loss of small quantities of blood. Thus, it is not unusual to observe fainting take place even in strong men, upon the loss of a few ounces of blood from the arm; a decided proof of an entire change in the action of the vessels of the brain.

In an instance of *pneumonia* I lately witnessed, of three weeks standing, in which *blood-letting* had been neglected at the beginning, and in which, from the continuance of pain and fever, with great difficulty of breathing, and a pulse approaching to the hectic state, suppuration was to be apprehended, the loss of

only three ounces of blood produced a very sensible feeling of weakness in the patient, which did not go off for several days. The benefit received, however, was not the less decisive. The pain was almost instantly relieved by it, the fever and quickness of pulse diminished, the expectoration became free; and from this moment might be dated the commencement of the patient's recovery, which was evidently accelerated by a frequent repetition of *blood-letting* to the same small amount, at intervals of six or eight days. The blood, at first was covered with a thick inflammatory crust, and the coagulum became contracted into almost a globular form; but this appearance of the blood gradually diminished as the disease subsided.

In cases where the strength does not admit of making *blood-letting* the principal means of cure, it may still, in reduced quantity, prove an useful auxiliary, and render the use of other means both safer and more effectual. In other diseases consisting in inflammation, this is well known to be the case, particularly with regard

to blisters, opiates, and diaphoretics of a stimulant nature. These can often be employed with safety and effect after *bleeding*, though they are frequently injurious before. And evidence to the same purpose has been adduced in regard to fevers.

After all, it is observation and experience that must decide ultimately, as to the precise value of *blood-letting* as a remedy for fever. My object, in the statement above given, has been to shew, that while the practice may be supported upon theoretical grounds, and on analogy, it is, at the same time, sanctioned by very extensive experience; while the objections that have been made to it are, for the most part, merely speculative.

Admitting then *blood-letting* to be, on very many occasions, a proper remedy for fever, some advantage may be probably derived, at times, from a particular mode of administering it. If fever consist essentially in a topical inflammation of the brain, it ought, like other inflammations, to be susceptible of relief from topical remedies. On this ground, there is, in

fact, an entire analogy between fever and other inflammations. Those who have objected to *general blood-letting* for the cure of fever have not hesitated to recur to *local* evacuations of blood from the head, in cases where the functions of the brain were observed to be more than ordinarily affected; and by this means, not only the most pressing symptoms have been relieved, but the whole disease has sometimes been carried off.

There are many cases, where *general blood-letting* may appear objectionable in fever: as in debilitated habits, in infants, and under other circumstances which will readily occur to practitioners, and which are supposed to prohibit its employment in other inflammations. In such cases, *local bleeding*, as by leeches or cupping, may form an important addition to the other means of cure.

Opening the temporal artery has been proposed and practised, as the most powerful means of moderating vascular action in the brain. But to this there are, I think, weighty objections. The blood in this way cannot be

drawn so quickly or certainly as by venesection, a circumstance that is occasionally of some moment. Nor does it appear likely, that dividing a small branch of the external carotid in the temple can be productive of any specific benefit, or materially influence the condition of the large vessels which immediately supply the brain with blood, to wit, the internal carotid and vertebral arteries; for the connexion of these with the minute branches of the external carotid artery, is trifling and remote. But the greatest objection to the practice of opening the temporal artery arises from the consequences of the operation. The pressure frequently required, in order to guard against future hæmorrhage, interrupts the circulation in a number of the superficial vessels of the head, and of course tends more or less to increase the force of circulation in those that are free. This effect must be communicated in some degree to the internal carotid arteries; at least it must be so, if there is any foundation for the specific advantages expected to be derived from opening these vessels.

Bleeding from the jugular vein would seem to promise the greatest advantages in affections of the head; while this vessel, from its size and superficial situation, offers every facility in the operation. It was a general practice with the ancients to bleed in this vein, in all inflammatory disorders of the head and neck: in modern times, however, the practice has gone greatly into disuse, though probably undeservedly. The free communication there is between the branches of the external and internal jugulars, cannot but render the drawing of blood by the former a ready and powerful means of lessening the force of circulation within the head. Accordingly, it has been observed that fainting takes place more readily by *bleeding from the jugular*, than in the ordinary mode of venesection in the arm*,—a clear proof this of a suspension of action in the vessels of the brain. Bonetus informs us, that in the year 1768, fevers were very prevalent, in which the brain was more than usually af-

* Heister's *Surgery*, p. 2. sect. 1. c. vii.

fect. Bleeding largely from the jugular vein, was found a sovereign remedy in these cases*.

Dr. Fordyce, (whose observations in regard to practical points are always entitled to great attention,) in the passages quoted below, declares himself hostile to the use of *blood-letting* in fevers. "If the disease which the author has endeavoured to define as fever be only meant, the taking blood from a large vein, in any part of the body indiscriminately, never diminished, shortened, nor carried off a fever in any case he has seen: *nor has he found any on record* in which it had this effect †."—And he adds, "taking away blood from the arm, or from any large vein, neither increases nor diminishes a fever, nor alters its course, as far as he has seen."

Again—"The further debility arising from emptying the vessels, by taking away a quantity of blood, is often such as to destroy the patient in the remaining part of the disease. Patients in consequence have been very often

* *Sepulchret. Anat.*, lib. 4. sect. 1. obs. 3.

† *Third Diss. on Fever*, p. 2. p. 5.

cut off, where blood has been taken indiscriminately from any large vein at the beginning of the disease, as the author has seen in a great many cases*.”

This would seem to be decisive against the practice of *bleeding* in fever; and no doubt it has had its influence on the conduct of practitioners in general; but it is to be taken with some consideration. Dr. Fordyce is here giving the result merely of his own observation; and, as his practice was confined to London, his remarks apply, of course, only to the disease as it appears in temperate climates, and even as modified by the air and modes of life of a large city. Allowing, therefore, that he is correct in his observation, it cannot justly apply to fever under other circumstances.

When he says, that he has neither seen *nor found any instance on record*, in which *blood-letting* has had the effect of diminishing, shortening, or carrying off a fever, he goes farther than the history of the disease will bear him out; for indubitable evidence has been brought

* *Third Diss. on Fever*, p, 12.

forward (and more will be hereafter adduced,) in which the contrary has taken place. There is likewise an obvious inconsistency in the passages quoted above, which must tend to weaken their effect. He says, "the further debility arising from emptying the vessels, by taking away a quantity of blood, is often such as to destroy the patient in the remaining part of the disease;" yet he had just before remarked "that taking away blood from the arm, or from any large vein, neither increases nor diminishes a fever, *nor alters its course*, as far as he has seen."

Another objection might be made to the opinions above given; which is, that no attention appears to have been paid to the circumstances of *time* and *quantity*, circumstances which, it is evident from what has been already observed, materially influence the result.

But even allowing Dr. Fordyce's objections to general *blood-letting* as a remedy for fever to be ever so well founded, his testimony in favour of *local* bleeding, from the vessels of the head and neck, is strong and decisive; not

merely as mitigating the most pressing symptoms, but in entirely carrying off the disease: as may be seen in the following passages:—

“Taking away blood from the vessels of the head has, in some cases,” he remarks, “immediately carried off fever: it has also tended to diminish delirium accompanied with fulness of the vessels of the head, even when it does not shorten the disease*.

“In the second species of delirium (i. e., attended with fulness of the vessels of the eye, flushing in the face, and, on dissection, fulness of the vessels of the brain), taking away blood by opening the external jugular vein, and letting five or six ounces of blood flow out, has diminished the delirium considerably, sometimes has carried it off entirely, *and with it the whole fever*. The same effects have been produced by applying two, or three, or four leeches:—this last method is more efficacious †.

“At the beginning of fever, it happens sometimes that very violent pain takes place

* *Third Diss. on Fever*, loc. cit.

† *Ibid.* p. 127.

in the forehead, which feels to the patient as if it affected the integuments of the cranium, and were merely external. In this case, the author has seen three or four leeches applied to the temples, give considerable relief to the patient, by removing the pain ; *and sometimes they have carried off the whole fever* *."

Upon the above, I would only remark, that it appears difficult to conceive a reason why bleeding from the jugular veins, or by leeches to the temples, should not only relieve a particular symptom, but sometimes carry off the whole disease, if this had not its seat essentially in the head, and were not of an inflammatory nature.

Upon the whole it may be observed, that the well established fact, of the cure of fevers of different descriptions by large and repeated *blood-letting*, is totally irreconcilable with any of the hypotheses heretofore given, with respect to the nature and seat of the disease ; while it is readily explained, as it appears to me, upon the principle here assumed. It de-

* *Third Diss. on Fever*, p. 129.

monstrates in the clearest manner, that the disease is not seated in the general mass of fluids ; for the removal of a few ounces, or even pounds, of blood could have no effect in altering the composition of the whole mass, nor in withdrawing a cause that is universally diffused through the system. Nor can fever be owing essentially to any *spissitude*, or *tenuity*, or *putrescency* of the circulating fluids ; for we find the blood, when drawn in fever, putting on at different times a variety of appearances, while at others it is not visibly changed from the natural state. It cannot depend upon *debility*, as its *proximate cause*, whether this be supposed to occasion *spasm* followed by *re-action* in the system, or to continue through the whole course of the disease ; for debility that is primary and essential, cannot, surely, be removed by loss of blood.

In no other way, as I believe, can the symptoms of *malignant* fever be explained, nor the cure of it by *blood-letting* be understood, than by the admission of inflammation in the brain as the essential or proximate cause. Admit

this, and the difficulties vanish. We can readily understand, upon this principle, why the action of remote parts, and indeed of every part, of the system, should languish or be ill performed, when the *great centre* of sensation and movement is itself rendered incapable of duly continuing its functions: we can see why early and copious bleeding should anticipate, as it were, and prevent the appearance of the most *malignant* symptoms in the subsequent stages of the disease; for by diminishing (where it does not totally cure) the topical affection in the brain, this important organ is enabled to carry on its functions more perfectly than it could otherwise have done: we see, in fine, why the young and vigorous, and the plethoric, suffer more from fevers of this description, than the weak and infirm—than the very young, or the very old; because, in such habits, it is the nature of inflammation to proceed with greater violence, and to terminate more speedily in disorganization of the affected part, with the consequent and necessary destruction of the functions dependent on it.

But if *blood-letting* be employed for the cure of fevers, we see also, from what has been adduced above, of what importance it is that it be early had recourse to, and to a proper extent. Authors are almost unanimous in asserting, that although bleeding may be useful and effectual in the first or second day of the disease, it is often hurtful at a later period. It is done with the greatest safety and advantage before the chain of febrile actions is fully established in the system, and before the part primarily diseased, to wit, the brain, has suffered materially in its structure or organization: at a later period, it may not only prove ineffectual, but perhaps conduce to a fatal issue.

It would, doubtless, be highly desirable, to be able to state with precision, the exact period at which blood-letting, as a remedy for fever, ceases to be safe or beneficial. This, however, cannot be done, for obvious reasons. The progress of the disease is more or less rapid at different times, and under different circumstances. In the fevers of hot climates, blood-letting is scarcely practicable after twenty

hours from the time of attack. Whereas, in this country, I have employed it in many instances with advantage, where the disease had subsisted for a week or two, or even longer. But it then always requires to be used with much caution, and to a very limited extent. As a general principle it may be observed, that the more the *sensorial* functions are disordered and oppressed, the less likely will blood-letting be to prove effectual.

Whether it can be employed without danger, in the most advanced state of the disease, when, for example, stupor prevails, and at the same time the general vascular action is greatly depressed; where hæmorrhages of black blood, *petechiæ*, *vibices*, and other signs of a *putrescent* tendency have already made their appearance, I cannot venture, from my own experience, to state, though there is not wanting testimony in favour of the practice, even under these apparently unfavourable circumstances.

SECT. XXVI.

OF VOMITING, AS A REMEDY FOR FEVER.

No fact in medicine is better ascertained, than the power of *emetics* in the cure of fevers of various descriptions. This has been observed in innumerable instances in *simple* fever—in the more *violent* and *malignant* kind—and even in some of the *exanthemata*. *Scarlatina* has repeatedly been checked in its career, and the patient restored almost immediately to health, by the timely administration of an *emetic*. There is no evidence, that I know of, of its having done so much in *small-pox* or *measles*; but though it does not appear capable of at once cutting short the progress of these diseases, it nevertheless appears to exert a beneficial influence on the future character of the disease.

In the *plague* which raged at Cracow, in Poland, in the year 1707, the mortality was exces-

sive. The symptoms chiefly were, anxiety, sadness, green and yellow vomiting, rigor and horror, succeeded by heat, lassitude, universal pains, intolerable *cephalalgia*, with a ghastly countenance, constant tossing, and delirium. Women even exposed themselves naked, like maniacs. To these were added all the other symptoms that are found to accompany fevers of the most *malignant* kind. When sweats broke out spontaneously, the sick were relieved. But medicine, it is said, was of little use, except *emetics*, which, if given at the very beginning, were found to be almost an *antidote* to the disease; as two or three grains of *emetic tartar**.

In other cases of *malignant* fever, *emetics* have been employed with more or less benefit. In the fever which annually rages at Senegal on the coast of Africa, in the rainy season, the disease, says Dr. Lind, seemed to proceed from a poison, as it were, got into the stomach; be-

* See a description of this malady by John Bern. Sthaar, M.D., in the *Acta Erudit.*, tom. 4, ab an, 1701 ad 1710. 4to. p. 491.

ginning with severe retchings, and often with a vomiting of bile. Upon its first attack in this way, he administered a few grains of *emetic tartar*, and found, if this medicine operated upwards and downwards, it generally relieved, and often entirely abated, all the symptoms: but this lucid interval continued only for a short time; for, commonly in six hours afterwards, the fever and vomiting returned, accompanied with a delirium. The administration of a second emetic did not produce so good an effect, or a remission of the fever*.

The utility of *emetics* in the cure of fever is to be referred, probably, to the principle of *counter-irritation*, and not, in general, to the evacuation which they occasion; and it is in exact unison with their effects in other inflammations. It is in pulmonic affections, more particularly, that emetics have been employed, chiefly with the view of promoting expectoration. But they are found to be not less serviceable in inflammatory affection of the joints, in *hernia humoralis*, and in ophthalmia, where

* Lind on *Dis. of hot Climates*, p. 54.

evacuation merely could have no share in producing the effect.

Emetics, when administered so as to occasion *nausea* merely, without actual vomiting to any extent, are unquestionably efficacious in moderating febrile movements, and occasionally in bringing them to a *crisis*. This may be collected from the description of the effects of *nauseating* remedies both in fever and in inflammation, given by Dr. Cullen, although there may be no foundation for the hypothesis by which he explains their mode of acting. They, however, produce this effect speedily, or not at all; there is very little, if any, evidence to prove that the continued employment of them, for many days in succession, has been productive of any material advantage: while a perseverance in their use is apt to occasion dysenteric purging, and to wear out the strength of the patient rapidly.

In order to account for the efficacy of *emetics*, in the cure of fever more especially, it is only necessary to advert to the intimate relation that subsists between the brain and stomach,

and the influence exerted by each over the other, reciprocally. Let the brain be injured by a shock, or by compression, and the injury is immediately pointed out by nausea and vomiting, almost as clearly as by the disturbance of its own peculiar functions. On the other hand, a state of nausea, any how induced, depresses at once the energy of the brain, and, with it, that of the whole vascular system. This is evident in the paleness, coldness, and general feeling of debility, that announce the approach of vomiting, and which sufficiently explain its beneficial influence on inflammation in general, but especially when this disease arises in the brain itself.

As with regard to *blood-letting*, the efficacy of *emetics* depends much upon the earliness of their administration. When given at the very commencement of the symptoms, and before the disease is fully formed, they often put an entire stop to its progress; and where they fail to produce so decided an effect, they in general check the violence of the disease, and mitigate its future symptoms.

From *theory*, the use of *emetics* in fever might be deemed improper, and even dangerous, from the interruption given, during the act of vomiting, to the return of blood from the head; in consequence of which, the arteries of the brain are excited to greater efforts. Violent vomiting, certainly, can not be employed without some degree of hazard in this respect; and it has, in fact, sometimes proved fatal, by occasioning a rupture of vessels in the brain. Some caution, undoubtedly, is requisite, in the use of emetics in fever, where the vascular action of the brain is already in such excess. Experience seems to have ascertained, that they are rendered not only more safe, but more effectual likewise, by previous loss of blood. But experience has also shewn, that they may be safely employed, in a great majority of cases, without any such precaution.

SECT. XXVII.

OF PURGING, AS A REMEDY FOR FEVER.

NEXT to *blood-letting*, *purgings* is, perhaps, the most powerful and most generally applicable remedy in the treatment of inflammation, especially when seated in the superior parts of the body. Accordingly, *purgatives* have been always held by practitioners in great esteem in diseases of the head, and have been supposed to operate by *derivation* or *revulsion*;—an antiquated doctrine, but which appears, in the main, to be well founded. It is certain that the force of circulation may be directed towards different parts of the system, and that topical affections are thus often susceptible of relief or aggravation. The action of purgative medicines, undoubtedly, is attended with an increased determination of the fluids towards the abdominal viscera, which tends greatly to counteract an active congestion in other and

distant parts. This appears to be one source of the benefit derivable from *purgatives* in the treatment of diseases. They also produce no small effect as *evacuants*, and are thus adapted to the cure of *inflammatory* disorders. But it is upon the principle of *counter-irritation*, that the utility of *purgatives* as well as of *emetics*, can be best understood.

It is in affections of the head, eyes, and throat, that *purgatives*, have been more particularly celebrated: they have, in all ages, been a favourite remedy for these complaints. On this account, they would seem to be well adapted to the cure of fever, upon the supposition that its seat and nature are as above suggested.

Indeed there is abundant evidence to shew, that purging may be employed with advantage in fevers of various descriptions, even such as are characterized by great debility, as the low fever or *typhus mitior*, and in *remittents*.

In the Philadelphia fever, Dr. Rush exhibited drastic purges, as calomel and jalap, with a degree of success unequalled by any other remedy. He conjoined with these cathartics,

blood-letting, and the other parts of the antiphlogistic plan. The dose exhibited was ten grains each of calomel and jalap, repeated every six hours, until it procured four or five large evacuations. The effects of this remedy he says, not only answered, but far exceeded, his expectations. It perfectly cured four out of the five first patients to whom he gave it, notwithstanding some of them were advanced several days in the disorder. This practice he learned from a manuscript account of the *yellow fever*, as it prevailed in Virginia in the year 1741, which had been put into his hands by Dr. Franklin, pointing out the utility of evacuations in the cure of that disease.

It is proper to observe, that, at the first appearance of this fever, Dr. Rush was led, by the symptoms, to consider it as a disease of debility; and he treated it accordingly by bark in all its forms, conjoining with this, wine, brandy, and aromatics; and he applied blisters to the limbs, neck, and head, with a similar view. He wrapped the patients also in blankets dipped in warm vinegar, following the

practice recommended by Dr. Hume; and he likewise rubbed mercurial ointment on the region of the liver. But none of these remedies, he says, appeared to be of any service; for only three out of thirteen recovered to whom they were applied*.

In a disease, called by Dr. Mosely the *putrid bilious fever*, which prevailed at Jamaica, in the year 1780, the extreme weakness into which every person sunk who was attacked, led to a mode of treatment, at first, by *bark* and *cordial* medicines, which did not prove successful. Dr. Mosely therefore “advised *purging* at the first onset of the disease, and directed it to be continued until contra-indicated by weakness. But so far,” he says, “was the result of that apprehension from being confirmed by the event, that it was found that the men acquired strength, in proportion as they diluted and were purged.” The purgative employed was a solution of *manna* and *cream of tartar*. “We did not lose,” he adds, “one man after this

* Account of the *Bilious Remitting Yellow Fever*, as it appeared in the City of Philadelphia, in the year 1793, *passim*.

mode of treatment was adopted ;” whereas, at first, every man that was seized, died*. In the *endemical inflammatory fever*, commonly called the *yellow fever* by writers, purging was employed with scarcely less advantage, after blood-letting to a large amount had been premised†.

Mr. Bryce, in his account of a fever which appeared on board the *Busbridge East India-man*, during her voyage from England to Madras and Bengal, in the year 1792, and which had all the malignant characters of the *yellow fever*, observes, that he trusted the cure almost wholly to *purging*. He found, he says, that by means of the most *drastic* purgatives, *provided early recourse was had to them*, he had acquired complete controul over the disease. He gave for the purpose large doses of calomel, following it by a solution of purging salts with emetic tartar. Sometimes the calomel was given in combination with jalap, or the cathartic extract ; and, on some occasions, even with gamboge. He has often given, he remarks, a

* *Treatise on Tropical Diseases*. By Benjamin Moseley, M.D. 3d edit., p. 200.

† *Ibid.* p. 459.

brisk cathartic of the kind above mentioned, when the pulse was so feeble as scarcely to be felt;—when hæmorrhages, low delirium, nervous tremors, and faintings, seemed to indicate the greatest debility;—and, after several copious, viscid, and extremely putrid evacuations, procured in this manner, he had the satisfaction to find that the patient very soon acquired great increase of strength;—that those threatening symptoms went off entirely;—and that, by continuing those evacuations according to circumstances, the disease was soon brought to a happy termination. Their good effects were so instantaneous, that he has seen a man carried upon deck, perfectly delirious, with *sub-sultus tendinum*, and in a state of the greatest apparent debility, who, after one or two copious evacuations, has returned of himself, composed, astonished at his newly acquired strength, and declaring himself to be infinitely recovered: which, indeed, Mr. Bryce says was evident to every one from his changed countenance and general appearance*.

* *An Account of the Yellow Fever, with a successful Method of Cure.* By James Bryce, Surgeon. London, 1796.

Mr. Bryce is of opinion, that a similar treatment might perhaps be applicable in the fevers of this climate, of the *typhus kind*; and certainly it would seem, from the above, that the debility attending these fevers can form no decisive objection to the practice. Were there any doubt, however, that the fevers of this country are curable in many cases by *purgatives*, it must have been removed by the late valuable publication of Dr. Hamilton, of Edinburgh, whose testimony on this subject is too strong to be questioned*. The particular mode of administering them, with the cautions necessary in their use, will come to be considered hereafter.

Some physicians (and among others the learned President of the Medical Society of London, in a work on Fevers published several years ago†) consider the *primæ viæ* as the primary seat of fever; and, consistently with this idea, they make the chief indication of cure to consist in the evacuation of the sup-

* *Observations on the Utility of Purgative Medicines in several Diseases.* By James Hamilton, M.D. Edinburgh, 1805.

† *Observations on Epidemic Diseases.* By James Sims, M.D. 8vo. 1773.

posed cause in the readiest manner, by *vomits* and *purges*. Whether this theory be well founded or otherwise, I shall not now stop to inquire; but it is reasonable to infer that the practice arising out of it had been found useful. If the pathology of fever which I have ventured to suggest be the true one, *purging* will come to be much more frequently employed in the cure of fever than hitherto, as it is probably applicable in many circumstances in which *blood-letting* may be less proper.

Not only have *purgatives* been employed with good effect during the course of fever, but they have been found powerful likewise in preventing relapse. Dr. Jackson, in his *Remarks on the Constitution of the British Army*, (p.172.) observes, "that relapses (in fever) are prevented with much certainty, by occasional brisk, even strong, purgatives; and by emetics." In the case of *intermittents*, however, it has been remarked by several accurate observers, that purgatives have a tendency to bring back the paroxysms, after the disease is apparently put a stop to. Upon what this seeming anomaly,

so opposite to what occurs in *continued* fever depends, I am quite unable to discover.

It is in the disorders of infants that the efficacy of *purgatives* in taking off fever is most strikingly displayed. Their utility here is so great and decided, as to have led to the suspicion that the real seat of disease in all these cases was the *primæ viæ*, and that purgatives merely operated by removing the cause. A disordered state of the stomach and bowels is, no doubt, capable of inducing *brain affection* in infants; but the latter is also frequently the cause of the former; and the two affections are in no case so identical or intimately connected, as not to demand a separate investigation. The good effects of *purgatives*, therefore, in the treatment of children's diseases, establish nothing certain with regard to their seat or origin. This point will be resumed hereafter.

It is worth observing that both *vomiting* and *purgings*, as means of carrying off fever, are rendered at once more safe and more effectual, by previous *blood-letting*; which, unless contra-indicated by particular circumstances, ought, in general, to be first employed.

Some practitioners have denied altogether the utility of *purgatives* in fevers, asserting at the same time that they tend to produce relapse. Dr. Fordyce, speaking on this subject, observes, that "such evacuation (namely purging), has never in any degree removed the fever, or prevented it from pursuing its ordinary course;" he has also seen, he says, "relapses much more frequently take place when purgatives have been employed after a marked *crisis*, or after the disease has gradually subsided, than when purgatives have not been employed*." I am not disposed to question the accuracy of Dr. Fordyce's observation, as far as this goes; but his conclusion may be fairly supposed to be too general, since it is in opposition to the experience of others possessed of scarcely inferior means of judging.

But while it is sufficiently ascertained that *purgatives* are capable of producing the best effects in the treatment of *idiopathic* fever, it must not be forgotten that they may be carried to a hurtful extreme, so as to induce actual

* *Third Dissertation on Fever*, part 2. pp. 19 and 20.

inflammation of the intestinal canal or its lining membrane, and thus to add to the danger of the disease. In the predilection for the use of purgatives, so common at present, such an occurrence I believe to be by no means rare. In these cases, traces of inflammation of the mucous membrane are discovered after death, and have been unjustly considered as the natural consequence of the fever itself.

S E C T. XXVIII.

OF SUDORIFICS IN THE CURE OF FEVER.

IF fever consist, as I have attempted to shew, in topical inflammation, we can easily understand why it should yield so readily, in many cases, to the employment of *sudorific* remedies; since these are of the most approved use in the cure of inflammation generally. *Sweating*, in fact, has been employed with equal frequency and success in both fever and inflammation.

The use of this description of remedies would naturally have been suggested by the observation, which could not but have been made, that these diseases, when left to themselves, frequently terminate by spontaneous sweating. Hence the idea, that something noxious (the supposed cause of the disease) was carried out of the system by this evacuation; and it would as readily occur to imitate by art this natural operation. In the *milder*

forms of fever, *sweating*, artificially excited, is often alone sufficient to carry off the disease; and there is evidence enough to prove, that, in the treatment of the *violent* and *malignant*, it deserves to rank among the most effectual remedies. "It still remains true," says Dr. Cullen, "that certain fevers, produced by a very powerful *sedative* contagion, have been generally treated, so far as we yet know, most successfully by sweating*.

In the *pestilential* fever which followed the great *plague* in London, in the year 1666, Sydenham latterly trusted the cure almost wholly to *sudorific* remedies; and with remarkable success. He does not, indeed, speak of this as absolutely the best mode of practice; for he gave the preference to early and copious *blood-letting*; but as he was often opposed in this point, by the prejudices of the people, and had found insufficient bleeding rather injurious than beneficial, he was in some measure compelled to adopt a mode of cure that was, upon

* *First Lines of the Practice of Physic*, § clxvii.

the whole, less successful, but which he was permitted to carry to the requisite extent.

Sweating, for the cure of fevers, has been excited by very various means. Every kind of *stimulant*, external and internal, heat, both dry and moist, diluents, *relaxants* as they are called, volatiles, spices, the essential oils, balsams, and resins; *opiates*, simply or variously combined; have all, at different times been, employed for the purpose, and all of them with unquestionable success. Some of these have been supposed to possess *specific* properties in the cure of fever, and have been especially complimented with the epithet *febrifuge*; such are the *antimonial preparations*, which have scarcely ever been omitted in the treatment. But there appears to be little foundation for such a preference.

The cure of fever by *sweating* has a perfect analogy in other inflammations, which are found to yield in a large proportion to a similar mode of treatment. In many topical inflammations, *after* bleeding has been had recourse to, and in many, also, that do not admit of this

evacuation, *sweating* is a common and an effectual remedy. The restrictions proper to be observed with regard to it, are precisely the same both in fever and inflammation; for when either of them is attended with much general vascular action, as pointed out by a full, hard, and strong pulse, *sudorific* remedies can scarcely be employed with safety; at least till the vigour of the system has been in some degree reduced by previous blood-letting, abstinence, or other means. But where the action of the heart and arteries is irritated, rather than increased in point of force;—where the pulse is contracted, quick, and weak, and the general habit of the patient feeble;—neither in fever, nor in topical inflammation of other parts, is *blood-letting* properly indicated. In such cases *sweating*, with an appropriate regimen, forms our principal means of cure. We have here, therefore, another point of resemblance between fever and inflammation, affording an additional argument of their common nature.

Although the efficacy of *sweating*, as a remedy for fever, under certain circumstances,

rests on much and decisive evidence, the use of it has of late years been greatly neglected among practitioners, though it still continues to be a favourite remedy with the public. This is to be accounted for in no other way, that I can perceive, than the following:—

When the immediate cause of fever (as well as of most other diseases) was supposed to reside in the blood and humours of the body; and when it was observed that copious sweats often immediately preceded its termination; it was natural to imagine, that the noxious cause was carried off by this evacuation. Hence, naturally, arose the employment of *sudorific* remedies, to imitate the depuration which Nature seemed to dictate, and, on some occasions, to complete what she had left imperfect. This mode of treatment was often found to be successful; and most so with those who adopted it the earliest, and carried it to the greatest extent.

But when more correct notions of the animal economy began to be entertained:—when it was perceived that the *humoral pathology*, and

the doctrine of the *concoction* and *expulsion* of morbid matters, had no foundation in physiology, and were at variance with the known laws of animal life, the theory of the operation of *sudorifics* was of course abandoned; and along with it, the practice itself, though sanctioned by the experience of ages, fell into disrepute. This is what has happened on many other occasions in medicine; to the no small detriment of the art. Useful practices have often been discarded, because they happened to be irreconcilable with the prevailing doctrines of the day.

It would seem not to be a matter of indifference, by what particular mode *sweating* is excited for the cure of fever; and the want of attention to this has, probably, in some degree, contributed to bring the practice into discredit. The ordinary mode of producing sweat by the exhibition of *stimulating* medicines internally, is infallibly attended with the effect of increasing the action of the heart and arteries, before the sweating takes place; and where the sweat does not readily come on, as is sometimes

the case, the increased action is communicated to the vessels of the affected part, and the disease is thus often aggravated, instead of being relieved. This not unfrequently happens in strong and vigorous habits.

Many, again, of the *sudorific* remedies in common use, contain substances which exert a *specific* action on the brain and its functions, and on this account might be termed *sensorial stimuli*. Such are *opium* and *narcotics* in general, and *alcohol* in its various forms; all of which manifestly excite the vascular system of the brain, and, when carried to excess, produce the very disease in question. These are undoubtedly useful in certain states and circumstances of fever, but are as certainly prejudicial in others.

The most simple mode of exciting sweating, and the most free from the objections stated, appears to be by the application of external heat to the skin, by bathing or other ways. With proper management, it is probable that sweating might be thus produced, without materially increasing the action of the general

sanguiferous system. Thus, among rude nations, fevers are commonly treated successfully by the vapour bath.

It may be remarked of the different evacuations above mentioned, as remedies for fever, (and the fact is not difficult to be understood), that they mutually assist the operation of one another, so as to render each more effectual. Thus *blood-letting*, where it does not absolutely cure, often makes other remedies more safe and efficacious. When, for example, the action of the heart and arteries is much increased, *sudorifics*, which are generally of a heating and stimulating nature, are sometimes detrimental. In such cases *blood-letting* is usefully premised. So also, where *emetics*, given at the commencement of fever, fail to cut short the disease, they are still of considerable advantage as preparatory to *sweating*, which they serve to render more full and efficient.

Sydenham says, that "it is found by experience that purging, *after bleeding*, quells a fever sooner and better than any other remedy whatever*:" and again, in the following page,

* Pechey's Sydenham, p. 432.

“for these reasons, I can, I trust, assert upon good grounds, that the above mentioned method of cure is more powerful than any other for the subduing fevers of most kinds.”

Mr. Beane, an army surgeon, describing the fever of Demerara, one of the West India settlements, observes, that *bleeding*, within twenty-four hours of the attack, or even after that time, relieved the headache immediately, and, *followed up by an active purge*, put a stop to the further progress of the disease*.

The indications of cure laid down by Dr. Jackson in *contagious fever* (the fever of temperate climates), were, on the first day of the disease, to excite a new train of action, by *vomiting, purging, and sweats*. If this was done, he says, within twelve hours from the commencement, the progress of the disease was either cut short abruptly, or the threatened violence so much mitigated, that accidents seldom occurred†.

* See *Mem. of Med. Soc. of London*. Vol. 5. art. 35.

† *Outlines of Fever*, chap. xi. sect. 1.

The good effects of the combined use of *blood-letting* and *purgings*, in the cure of fever in the West Indies, are strikingly displayed in the following narration by Mr. Downey, a navy surgeon. "The usual consequences of bleeding were," he says, "an abatement of the pain of the head, stomach, and loins. Though the pulse had no great degree of hardness or fullness, and though the patient was often liable to faint on the loss of four or five ounces of blood, yet these circumstances did not in any case deter me from carrying on the evacuation, to twelve, sixteen, or even twenty ounces, if the pain in the head was very violent. The evacuating medicine having operated briskly, scarce any pain remained; but, in general, on the next morning, some giddiness was complained of, which was relieved by another dose of calomel and jalap, or salts; the same medicine was repeated on the third day, or on the fourth, if the patient was tolerably free from complaint on the third. In many, the disease required bleeding two or three days successively, or even twice in the twenty-four hours, as the pain in

the head or region of the stomach was more or less disposed to give way ; and the evacuations by stool were always kept up in proportion to the bleedings. In relapses which occurred at the end of seven or ten days, or later, the same mode of treatment was used ; and though it was not often necessary to carry it to the same extent as at first, yet the good effects were equally visible*.”

* See Dr. Trotter's *Medicina Nautica*, Vol. 2.

SECT. XXIX.

OF THE EFFECTS OF EPISPASTICS IN THE CURE OF
FEVER.

It had been frequently observed by physicians, that fevers subsided of themselves upon the spontaneous appearance of inflammation in some external part of the body: hence it was natural to attempt bringing about the same end by artificial means. With this view, *blisters*, and other means of exciting inflammation on the skin, were resorted to, and often, as will be seen, with success.

This class of remedies has been long in frequent use in the treatment of fever, in all its stages and varieties. The views, however, with which they have been employed are widely different, and sometimes contradictory. At one time, they have been used as *evacuants* simply, for diminishing the quantity of the circulating mass; at another, for the purpose of

drawing off morbid humours, the alleged cause of the disease. While the mechanical doctrines prevailed, *blisters* were applied as a means of resolving and attenuating the supposed spissitude of the fluids, and thus remove obstruction. By some they have been considered as general stimulants, serving to keep up the strength of the system under the debilitating influence of fever. Of late, however, they have been employed rather as palliatives, for the relief of particular symptoms, than as having any material influence on the regular course of the disease.

When we consider the great and acknowledged efficacy of *blisters* in the treatment of inflammation, wherever seated, we shall be at no loss to understand their good effects in the case of fever, without recurring to any of the hypotheses above alluded to. It is on the principle of *counter-irritation* alone, I apprehend, that their action can, in any case, be explained. Upon this ground, by relieving the primary morbid action going on in the brain, they often lessen or remove delirium, abate

headache, diminish stupor, and indirectly procure sleep: and by these effects, moderate the most distressing symptoms of the disease. That *blisters* are really productive of these advantages in the treatment of fever, we have the testimony of the best writers in proof.

“The headache, which is a very distressing symptom in the beginning of fevers, is almost certainly relieved,” says Dr. Heberden, “by a blister between the shoulders: and the same remedy equally relieves the inflammation in sore throat, pleurisies, and peripneumonies*.”

“Blisters,” says Dr. Home, “appear of little use in *curing* the typhus; yet they are of the greatest utility in relieving the severe headache, a troublesome symptom, which always attends it. Blisters, applied to the temples remove this symptom most successfully, without producing *directly* any good effect on the fever, though they may *indirectly* by removing one cause of watchfulness and weakness. To prove this by facts, would be to quote almost every *low fever* that has appeared in the clinical ward†.”

* *Commentaries on the Hist. and Cure of Diseases*, art. *Fever*.

† *Clinical Experiments*, &c. sect. 2. p. 30.

In a few instances, *blisters* have not only had the effect of palliating the symptoms of fever, but have wholly and speedily carried off the disease. Dr. Lind remarks, "that in a moderate infectious fever, where the source of infection is not very violent, if twenty patients be blistered, sixteen will next morning be entirely free from headache, heat, pain, and fever." And he observes, in another place, that in fevers, arising on ship-board, from the crews being too much crowded together, "on the first appearance of the fever, and of the head being affected, the application of a blister almost certainly removes it*."

Dr. Fordyce likewise remarks, that "he has seen, in several instances, inflammation, produced by applying stimulants to a part of the body, when a patient is affected with fever, carry off the fever entirely in the space of twenty-four hours:" "yet," he adds, "it has but seldom this effect: it only commonly alleviates the disease, or takes off some of the

* *On Hot Climates*, p. 237.

symptoms; it sometimes carries off headache, or diminishes it; it diminishes, rarely carries off delirium, if it has arisen; and so of the other appearances, which take place in fever *."

But although blisters have been found thus decidedly advantageous in the cure of fever, they have been very differently estimated by different practitioners. Some have employed them indiscriminately, and to an extent proportionate to the violence and danger of the disease; while others have almost wholly rejected them. By some they have been employed chiefly in the early stages of fever; others have confined their use to the latter periods of the disease.

Dr. Heberden † considers blisters to act as cordials in *low fevers*,—an idea that was also entertained by Huxham ‡, and many others. Dr. Fordyce, on the contrary, denies that they

* *Third Diss. on Fever*, Part 2. p. 113, 114.

† *Loc. cit.*

‡ Quando solida torpent, circulatio languescit, spiritus sunt effoeti, et comate corripitur æger, tunc vesicatoria sunt adplicanda, et utilitatem præstant eximiam, quocunque febris tempore talis symptomatum series.—T. 2. p. 115.

keep up the strength, or make any dormant power act; but says, that by occasioning greater frequency and smallness of the pulse, and preventing sleep, they rather weaken than give strength, when employed towards the end of fevers*.

This contrariety of sentiment upon a practical point may be referred to the various and opposite views that have been entertained respecting the nature of fever, and has given rise to the most contradictory indications. Upon the principle I have ventured to lay down, we have no difficulty in comprehending why *blisters* should sometimes have the effect of taking off fever entirely, especially when applied on or near the head;—nor why they should relieve, where they do not absolutely cure: since all this is in entire analogy with the treatment of other inflammations.

The restrictions to which they are subject in fevers, are just the same as on other occasions. Where the general vascular system is acting with unusual violence, and where the irritabi-

* *Third Diss. on Fever*, Part 1. p. 249.

lity of the body is in excess, *blisters* uniformly appear to be hurtful, both in cases of fever and of inflammation. In different circumstances, they are found eminently serviceable in both.

It does not appear to be sufficiently known, whether any advantage arises from the use of *cantharides* for the purpose of exciting inflammation, in preference to the other *rubefacients*, as they are called;—nor whether they are more efficacious, as applied to the head itself, or to parts more or less remote from it—nor whether their repetition is likely to succeed, or to be useful, where the first application of them has failed. A great deal of observation is yet wanting to determine these, as well as many other points, regarding the treatment of fever.

Cantharides readily excite topical inflammation in the urinary passages, which is not the case with the other *rubefacients*. This effect may be beneficial, or otherwise, in respect to fever. It has been remarked that when, from the use of the cold regimen in fever, catarrhal inflammation has been induced, the primary disease has had its symptoms mitigated, and

the danger apparently lessened. I think I have more than once observed similar advantage to accrue from the coming on of strangury, after the application of a blister in fever.

SECT. XXX.

OF RELAXANTS AND ANTISPASMODICS IN THE
CURE OF FEVER.

UNDER the former denomination have been included a variety of drugs and applications, which probably operate in very different ways. The term itself is, indeed, objectionable, as being derived from an hypothesis respecting the nature of fever, that has no foundation in probability. There is no reason to believe *constriction* to make any essential part of the character of fever: and if *relaxants*, as they are called, have been found useful towards the cure, their good effects must be explained in another manner.

Among *relaxants*, have been chiefly ranked *antimonial* preparations; certain emetic medicines in nauseating doses, as *antimony* and *ippecacuanha*; neutral salts, as *nitre*, the common *saline draught*, *Mindererus's spirit*, &c.; the

warm bath; and *fomentations* to the extremities. It is difficult to estimate the value of these different applications as remedies for fever, a disease that has so strong a tendency to terminate spontaneously in health. There is little doubt, however, that their merits have been over-rated. The good effects of many of them seem to be derived from the evacuations which they frequently produce, by sweat, stool, or urine.

The use of *warm bathing* as a medical agent, is of great antiquity. Hippocrates repeatedly mentions it, as applicable to the cure of acute diseases; as do Galen, Cælius Aurelianus, and many others. Celsus also speaks in its favour, but under certain limitations, and chiefly when applied in the *intermissions* of fever. In modern times, the practice has gone much into disuse in febrile diseases, except among rude nations, who still resort to warm bathing, or the vapour bath, as a remedy in most of their acute disorders.

When we consider the large portion of the body, the conditions and actions of which are immediately altered by the application of the

warm bath;—the change in the determination of the fluids, that takes place in consequence;—and, moreover, the connexion that subsists between the skin, as an organ of sense, and the brain: we shall be prepared, even *à priori*, to expect considerable effects from the *warm bath* as a remedy for fever. In the *Exanthemata*, as in *small-pox*, and in the fevers of infants, there is very decisive evidence of its utility. It has been recommended also in the *yellow fever*, by a late respectable writer, Dr. Jackson, alternately with the *cold affusion*, which it seemed to render more efficacious. This practice was adopted by Dr. M'Lean, in the St. Domingo fever, and with the best effects*. It is needless to dwell on the utility of *warm bathing* in internal inflammations in general, since every day's experience evinces it; and there is abundant reason, from analogy, to expect advantage from it in the case of fever. Its precise value, however, in this respect, is yet undetermined.

* *Inquiry into the Nature and Causes of the Mortality among the Troops in St. Domingo.* By Hector M'Lean, M.D. 1797.

The partial application of heat to the surface, as by fomentations to the extremities, is more familiar to practitioners. These have not only occasionally relieved particular symptoms, but have now and then brought the disease to a critical termination. "It sometimes happens," says Dr. Fordyce, "that a moderate sweat breaks forth, the patient falls asleep, and is considerably relieved. The author has seen, in a few cases (but very few in proportion to those in which this practice has been employed), that a complete *crisis* has taken place, and the patient has been freed from the disease. In several cases the patient has slept, and the delirium has been considerably relieved*.

It is highly probable that, in many states of fever, warm fomentations to the head itself would be advantageous; upon the same grounds that they are found to relieve inflammation in the other cavities of the body—I speak here, however, rather from theory, than from actual observation.

The comparative value of *warm* and *cold*

* *Third Diss.*, Part 2. p. 102.

applications, as remedies for inflammation, seems to be by no means sufficiently understood.

Antispasmodics, a term that, like *relaxants*, includes substances of very different natures, have likewise been much employed in fevers, from the time of Hoffman downwards; and on many occasions, undoubtedly, with advantage. This class of medicines was first designated, and introduced into practice upon a false theory; and hence their use has probably not been well understood; yet it certainly comprises many of the most active and valuable articles of the *Materia Medica*, and which will come to be spoken of under the heads of *Simple Stimulants* and *Narcotics*, or *Sensorial agents*. The efficacy of some of the most highly vaunted *antispasmodics*, as *musk* and *castor*, is at best but equivocal.

The employment of what are called *relaxants* and *antispasmodics*, as remedies for *idiopathic* fever, will be best understood by adverting to the use that has been made of them in the treatment of ordinary inflammation.

SECT. XXXI.

OF THE USE OF SIMPLE STIMULANTS IN THE
CURE OF FEVER.

ALMOST every variety of *stimulant* has been employed, with great freedom, in the treatment of fever; and, no doubt, occasionally with advantage; though their precise value, and the particular circumstances under which they are likely to be advantageous, or the contrary, are, I believe, very imperfectly understood.

The use of *stimulating* substances in fever is of very great antiquity, and has been continued with more or less regularity, down to the present time. The ancients were in the habit of employing multifarious compounds of this description; such as the noted *Theriaca Andromachi*, the *Confectio Damocratis*, and many others, which were looked on as *antidotes* to the virus that occasioned pestilential fevers, as well as to poisons in general. That these com-

pounds are capable of very useful application in the treatment of fever, no one will question who has been at all accustomed to employ them; nor will an adequate substitute be readily found for them, in any of the preparations in present use; a rage for simplifying, however, has almost discarded them from modern practice.

The *simple stimulants* in most frequent use at present, in cases of fever, are the *serpentaria* and *contrayerva*; various spices; and the *ammonia*, or volatile alkali.—Whether camphor is to be ranked with these, I cannot determine. By some, camphor has been called a *stimulant*, by others a *sedative*; but neither of these denominations sufficiently expresses its character. The effect of this drug in producing *syncope*, or an approach to the epileptic state, when given in large doses, as half a drachm or two scruples, would seem to refer it rather to the class of *narcotics*, to be hereafter mentioned.

Dr. Wright mentions, on the authority of Dr. Drummond*, that in the most dangerous stages of the *yellow fever*, as it occurred in

* See Med. Facts and Obs., Vol. 7.

Jamaica, the *Cayenne pepper* was given in doses of three grains, and repeated every two or three hours, till a generous warmth took place, which was kept up so long as the debility or vomiting lasted. *Mercury* was exhibited freely at the same time, so as, if possible, to affect the mouth. The same practice was resorted to by Dr. M'Lean, in the *St. Domingo* fever. When the pulse began to sink, and the vital energies to decline, he had recourse to the warmest *stimulants*, such as *æther*, *brandy*, *Cayenne pepper*, *brandy baths*, &c*.

In Dr. Duncan's *Medical Commentaries* for the year 1787, a letter is given from Mr. James Stephens, a medical practitioner of the island of *St. Christopher*, in the West Indies, mentioning the good effect of the *capsicum* in large doses, in the *putrid* ulcerated sore throat. He says he gave it to four hundred patients, with the happiest success. A paper to the same purpose, by Mr. Collins, of the island of *St. Vincents*, will be found in the second volume

* M'Lean on the Mortality among the Troops in *St. Domingo*, 1797.

of the *Medical Communications*. This gentleman made an infusion of three table-spoonfuls of *Cayenne* pepper, in half a pint of boiling water, adding to it, when cold, an equal quantity of vinegar. Of this, a table-spoonful was given in some cases, every half hour. He has known it given also, he observes, for the suppression of the vomitings which occur in the *putrid* fever of the island: and allusion is made to Dr. Bancroft, author of the *History of Guiana*, who was accustomed to give this medicine, with the utmost success, in the *intermittent* fevers of that colony.

Hillary, in his *Treatise on the Diseases of Barbadoes*, recommends the *tincture of cantharides*, in doses of twenty drops twice a day, as a *stimulant* in *typhus*. This induced Dr. Home to give it a trial; and the result, as published in his *Clinical Histories and Dissections*, is much in its favour. He gave the medicine in larger doses than Hillary recommends, viz. thirty drops thrice a day; and was fully convinced of its utility. It produced, he says,

scarcely any sensible effects, except a sensation of heat in the stomach.

To this I may add, the vulgar practice of curing agues in this country, by pepper, brandy, and other active stimulants.—It is not my intention, in mentioning this practice, to recommend its indiscriminate adoption, more than that of *blood-letting*, or any other of the means pointed out above. It is sufficient for my purpose to have shewn, that fevers have frequently been thus treated with success.

This fact may, at first view, seem adverse to the doctrine of fever being founded in inflammation; since it might be difficult to conceive that an active topical affection should admit of relief from such treatment. We have, however, the analogy of many other inflammations in its support. In certain stages of *pulmonic inflammation*, when the violence of arterial action has been reduced by previous evacuation, and where the habit of body appears unfavourable for loss of blood; both the *volatile alkali*, and the *seneka*, (a highly acrid root) have been employed with equal freedom and success: as

have likewise a variety of other *stimulating* substances. The use of the most active remedies of this class in ligamentous inflammation, as in many cases of rheumatism, is too well known to need dwelling on.

The employment of *stimulants* in the later periods of inflammation, even of the active kind, is a very ancient practice, and quite independent of all theory. Celsus, in speaking of the cure of *ophthalmia*, insists particularly on this point. “Hæc enim (*balneum ac vinum*), ut in recentibus malis aliena sunt, quia concitare ea possunt et accendere, sic in veteribus, quæ nullis aliis auxiliis cesserunt, admodum efficacia esse consueverunt*.”—It is hardly necessary to observe, that it is in the latter stages of *idiopathic* fever that *stimulants* are chiefly indicated.

* Lib. 7. cap. vi. art. 8.

SECT. XXXII.

OF THE CINCHONA AS A REMEDY FOR FEVER.

OF the *cinchona*, or *peruvian bark*, so useful on many occasions in fever, the same contradictory sentiments have been entertained, as of most other of the active *febrifuge* medicines. In one age, it has been proscribed altogether from practice; and in the succeeding one, perhaps, has been looked upon as a *panacea*. Morton administered it in almost every stage and variety of fever, both of the *continued* and the *intermitting* form; or rather, to speak more correctly, he thought that he saw, in the character of almost every febrile disorder, obscure indications of the *intermittent* type, cloaked in the garb of *continued fever*; and he attacked it, in consequence, with *the bark*, which he supposed to have the property of neutralizing or destroying the *febrile acrimony*, or material cause of

the disease*. Others, though equally admitting a distempered state of the fluids as the cause of fever, but denying the power of *the bark* either to eliminate or to destroy it, have dreaded the use of this remedy even in intermittents, from a belief in its tendency to *lock up* the supposed noxious cause, and prevent its elimination from the body.

Even in our own times, practitioners have been found to differ very much, in their estimate of the *Peruvian bark* as a remedy for fever. Some, conceiving the disease, or at least certain varieties of it, to be founded essentially in *debility*, have advised the exhibition of *the bark* through the whole course of continued fever, as a strengthening remedy; while others have confined its use entirely to the class of *intermittents*. Some, again, have employed it as an *antiseptic*, believing in *putrescency*, as an essential character of some fevers. But it will be impossible to acquire just notions of the virtues and powers of this medicine, without discarding from our minds such unsupported hypotheses.

* Mortoni *pyretologia*, passim.

The medical powers of the *cinchona* are hardly to be deduced from either its sensible or chemical properties; nor from its obvious effects in the healthy state of the body. To the taste, it is bitter and astringent; and it is said also to be aromatic; but in these respects it is greatly surpassed by other articles of the *materia medica*, which yet have not the same efficacy in the cure of fevers. Nor have its properties been satisfactorily imitated by any artificial combination of these principles.

In the healthy state of the body, *the bark* has little sensible operation. It sometimes induces costiveness, and sometimes purging; but these effects are, in general, very transitory. If it produce any general effects in the system, they are at most but inconsiderable, or at least are not very obvious. It has been called a *tonic* or strengthening remedy: but if it have really any such effect, it is by removing a cause of weakness, and not by any direct agency of this kind. Thus it often restrains preternatural evacuations, and prevents the recurrence

of febrile movements, and thus *indirectly* tends to increase the strength of the system.

The most striking property of the *cinchona*, in a medicinal point of view, is its power of preventing the recurrence of febrile paroxysms, when exhibited in the intervals of these. On this point, all are agreed. But some practitioners have gone farther, and have maintained that it is possessed of scarcely inferior powers in the cure of continued fever, at least of certain species, as the *low nervous* and *malignant* forms of fever.

A late eminent physician, whose practice in the *General Dispensary* furnished him with ample opportunities for observation, says, "I solemnly declare that I never saw one case of a *nervous, putrid, or malignant* fever, when the person could be brought to take this medicine in sufficient quantity, which turned out unfortunately. As to the quantity, I must, however, remark that I never relied upon less than six or seven ounces in a dangerous case, given in little more than two days; but sometimes three ounces were sufficient. I must likewise add,

that I never saw the highest dose in these fevers disagree with the stomach at the time, nor do any hurt afterwards." He allows, however, that the patient may seem worse after taking it; "but this is a circumstance," he adds, "which I have often met with, and learned to disregard, from finding that the patient never died*.

A considerable number of years have elapsed since the publication of this opinion, and I know not how far the subsequent experience of the author confirmed, or otherwise, his sanguine expectations from this remedy. But other practitioners have given nearly as favourable a report. His learned colleague in the *Dispensary*, Dr. Lettsom, who had great merit in having very early opposed the prevailing prejudices of the common people with regard to cool air in fevers, also gave bark very liberally, and was fully satisfied of its efficacy. It is proper to observe, however, that as the bark was commonly given at the same time that the cool

* *Observations on Epidemic Diseases*, By James Sims, M.D. 8vo. 1773. p. 273.

regimen was strictly enforced, and in cases where the patients had been previously immured in close and ill ventilated rooms, it is not easy to determine what portion of the benefit received was due to each. It is remarked, besides, that the bark, when given liberally, generally purged the patient; and we know that when it produces this effect in *intermittents*, it rarely effects a cure*.

It is mentioned in the *Memoirs of the Society of Haerlem*, that Dr. Verryst, a Dutch physician, gave *bark* in *malignant* fevers, to the amount of nine or ten ounces during the three first days of the disease. And nearly an equal quantity has been lately recommended by Dr. La Fuente, a Spaniard, in the *yellow fever* at its commencement.

On the other hand, many physicians, of good observation and extensive experience, have condemned *the bark*, in general terms, in cases of *continued* fever. Most practitioners in America, and, I believe, in the West Indies also, at pre-

* See *Memoirs of the General Dispensary*. By John Coakley Lettsom, M.D. *passim*.

sent consider this medicine as injurious in the fevers of tropical climates, unless where there are distinct *remissions* to be observed, or the patient is already convalescent. Dr. Fordyce considers it as hurtful, rather than beneficial, in the ordinary *continued* fevers of this climate, though he admits that it has occasionally proved successful. I shall quote his words :—

“ The author,” he says, “ has seen many cases, in which it (the *cinchona*) has been employed in a regular *continued* fever, sometimes with success ; but it has much oftener failed of success. Where it has failed, the relaxations which began to take place in the disease have been much diminished, the pulse has become more frequent in the morning, the headache more considerable, the skin drier, the tongue covered with a thicker fur, the costiveness greater (if the patient was not thrown into a purging), the oppression upon the *præcordia* greater, and likewise the difficulty of respiration increased. On the following evening, the head has been also more affected; that is, the confusion and delirium have been much more considerable, and the patient altogether

worse than he probably would have been if no remedy whatever had been exhibited; and there has been less chance of *crisis* in the fever, and it has been longer in being worn out*.”

If such be the true character of *the bark* in the treatment of *continued* fever, it seems, as Dr. Fordyce observes, to have a greater chance of doing mischief than good. Dr. Heberden, with his usual caution, says, respecting the use of *the bark* in these cases, “I am not so sure of its being useful, as I am of its being innocent, whether in decoction or powder†.”

As it is evident, from all this, that there are circumstances in *continued* fever in which *the bark* is capable of bringing the disease to a termination sooner than would otherwise happen, it is of great importance to determine, if possible, what these circumstances are. Possibly, some light may be thrown upon the subject, by considering it in the point of view in which I have endeavoured to place it. If fever be of the nature of inflammation, it is worth while to

* *Third Dissertation on Fever*, Part 2. p. 148.

† *Commentaries*, art. Fever.

consider the effects of *the bark* in the latter disease, in order to discover if any analogy exist between them in this respect.

In inflammation of an active kind, occurring in vigorous habits, and in the early stage of it, experience seems sufficiently to have proved that *bark* is an improper remedy. But when the disease arises in debilitated constitutions, or has gone on for some time without altering the structure of the part, and when evacuations have been made proportioned to the activity of the disease and the vigour of the system, the *bark* is found to be really an useful application.

In *erysipelatous* inflammation, occurring in large towns, and in persons of no great strength, the *Peruvian bark* is found, or thought, to be more successful than an evacuant plan of cure. And it is probable that some fevers partake of the nature of *erysipelas*, since they often mutually give rise to one another, by what is called *metastasis*. If *the bark* can be used with impunity, and even with advantage, in such a state of the system as occurs in acute rheumatism, as is asserted by Morton, Fothergill, and Hay-

garth, there seems little reason to be apprehensive of it in *idiopathic* fever, with ordinary precautions.

When inflammation assumes an *intermittent* or *remittent* type, as is not uncommonly the case, it is found to be as much under the dominion of *the bark*, as fever itself in similar circumstances. Thus when *hemicrania*, *ophthalmia*, *odontalgia*, &c., recur periodically, the power of *the bark* is nearly as effectual, as in preventing the returns of an aguish paroxysm. Dr. Herberden mentions, that a disposition to frequent catarrhal cough was removed in a person, and the disease in consequence prevented, by a long continued use of this remedy. Hence an additional proof is afforded, of the analogy between fever and inflammation. *Bark*, in all cases, seems to have a power of rendering the body less open to the impression of morbid causes.

S E C T. XXXIII.

OF THE USE OF NARCOTICS IN FEVER.

THERE is a class of medicines which affect, in a peculiar manner, the functions of the brain, or *sensorium*, and which have been called *narcotics*, *hypnotics*, or *anodynes*; with other appellations expressive of a stupefying quality, or the faculty of easing pain and inducing sleep.

The principal *narcotics* enumerated by writers on the *materia medica*, are *opium*, *cicuta*, *belladonna*, *hyosciamus*, *stramonium*, *nicotiana*, *lauro-cerasus*, the *black cherry*, the *bitter almond*, with many other fruit kernels, which appear to contain an essential oil, altogether similar in its properties to that of the laurel; *camphor*, which, in large doses, manifestly disorders the functions of the brain, and which has been used with peculiar frequency in fevers, especially those of the *malignant* kind; *digitalis*; the *tea-plant*, especially *green tea*, which unquestion-

ably belongs to this tribe; *æther*, *wine*, and *alcohol*. There are probably many others that we are but little acquainted with, except as poisons; I may mention, in particular, certain species of *mushroom*, which excite the greatest disturbance in the functions of the *sensorium*, and, in large doses, readily prove poisonous. Certain *gases* also come under this head, as *carbonic acid*, the *nitrous oxyde*, &c.

These substances, considered as a class, are by no means properly designated by the terms *narcotic* or *anodyne*; since some of them neither induce sleep or *stupor*, nor have any direct tendency to relieve pain. This is the case especially with one of the most powerful of them, the *lauro-cerasus* *. The only circumstance in which they seem to accord, is in their effect on the functions of the brain, (the *sensorial functions*) which they all *primarily* disturb, in greater or less degree; affecting the rest of the system in a *secondary* way only. This, in my opinion, forms a proper basis for denominating them; and I have ventured accordingly

* Cullen's *Materia Medica*, Vol. 2. p. 217.

to class them under the common name of *sensorial* agents, or medicines that operate *specifically* on the brain, or *common sensory*.

But although these substances all agree in this respect, their operation on the system generally, and even on the brain itself, is by no means uniform, but, on the contrary, greatly diversified; so that no two of them produce effects precisely similar. Some appear to affect in a peculiar manner the *mental powers*, and proportionally little the other functions of the brain. This is the case with the poisonous *mushroom*, which induces a delirious hilarity, bordering on insanity; and the same effect, in a still greater degree, has been of late experienced, from the inhalation into the lungs of the *nitrous oxyde gas*.

Opium appears to have, of all, the greatest tendency to induce *sleep*; though many others have this effect in a greater or less degree. *Green tea*, on the contrary, is found to occasion *watchfulness*.—Some appear to affect the *organs of sense* more than others, while some disturb in a particular manner the *voluntary*

power; as *green tea*, which, in many persons, occasions tremor of the limbs.

Some *narcotics*, as *alcohol* and the various fermented liquors, commonly occasion an accelerated action of the heart and arteries, with increase of heat: while others produce little of this effect, or even a contrary one; as with respect to the *digitalis*, which renders the action of the heart less frequent, and reduces the animal temperature. Some again, as *opium*, induce torpor of the intestinal canal, and diminish secretions; while the *cicuta*, and some others, appear to have no such effect.

Thus it appears, that the effects of this class of substances are very various; and it is certain that they can seldom be substituted for one another in practice, without disadvantage. And not only do they differ widely from one another, in their effects on the system, but the operation of each is different at different times, according to the habit of body, dose, previous use, and various other circumstances. The proper administration of them in disease, therefore, is a matter of no small difficulty, and calls

for much of both experience and discrimination on the part of the practitioner. There is probably no class of medicines more abused in actual practice, nor, upon the whole, more unsuccessfully employed.

The effect of the different *narcotics* in disordering different functions of the brain, relatively to each other, is to be accounted for by their influencing particular parts of the organ, in preference to others. This would seem to be the proper explanation, if it be admitted that the different parts of the brain are devoted to different purposes, and connected with different functions: a supposition that can hardly be questioned.

The powerful action of the *sensorial* agents on the brain and its functions, would seem to point them out as probable remedies for *idiopathic fever*. In reality, the value of many of them in this respect, is fully established by experience. When, however, it is considered, that their mode of acting has always hitherto been explained upon hypothetical principles, and that the indications which they have been

employed to fulfil have been chiefly imaginary, it may be justly questioned whether their proper administration is in any case thoroughly understood.

Of all the *sensorial agents*, *opium*, perhaps, has been the longest and most frequently used in the cure of fever. In all ages, from the time that medicine has been practised as an art, and any records of it have been preserved, we find that *opium*, in one form or another, has been a favourite remedy. The celebrated *theriaca* of Andromachus, the *diascordium*, and other ancient compounds, the *formulae* of which have been handed down to us, owe much of their activity and remedial powers to this ingredient.

Much difference of opinion, however, has existed among practitioners, in regard to the operation of *opium* in the system. By some, it has been classed with *sedatives* (*sedantia**), in allusion to a supposed property of allaying action generally in the system : while by others, particularly of late years, it has been looked

* Cullen's *Mat. Med.* Vol. 2. p. 217.

upon in the light of a *stimulant*, and that of the most active kind.

This contrariety of sentiment, appears to have arisen from not discriminating sufficiently between the *primary*, and more *remote* effects, and from considering as *general* agents, substances that exert their principal action upon an individual organ. *Opium*, and the other *narcotics*, appear to influence peculiarly, and, as it were, *specifically*, the brain and its functions; while they affect the rest of the system in a *secondary* way only, and as a consequence of the previous change induced in the brain. Thus, if *opium* renders the pulse at the wrist slower and fuller, as is frequently the case, the effect is to be ascribed to the change previously induced in the brain, by which the disposition to contract, both in the heart and arteries, is lessened: and so of the other effects.

These *secondary* effects of *opium* in the system, differ much at different times, according to the state of the brain itself, and also that of the general system. Hence the effects of *opium* are not at all times the same; it at one time

renders the pulse quicker, at another slower; at one time it increases, and at another diminishes the animal temperature; and thus it has been called a *stimulant* or a *sedative*, according to the effect it may have produced at the particular time.

The use of *opium*, as a remedy for fever, can only be understood, as it appears to me, from a consideration of the operation exerted by it on the brain *primarily*, and especially upon the state of its *vascular action*; for it is through this, as I believe, that the functions of the organ become affected. It has indeed been often supposed to exert an immediate influence on the *nervous principle* itself, or, as Dr. Cullen expresses it, to diminish the *mobility* of the *nervous fluid*. Such an opinion, however, there are no grounds for maintaining; since we are too ignorant of the nature of the brain and its functions, to warrant the use of such language.

Opium appears to increase the arterial action of the brain, and in this way, probably, disturbs its functions, and through it, the rest of the system. This effect of opium takes place

indifferently, whether it be applied to the brain itself *topically*; to the stomach; to the intestines by injection; or to the surface of the body.

When taken in pretty considerable doses, and especially by persons in high health, or who are labouring under *inflammatory* disorders, it produces, in general, distressing headaches, with throbbing of the arteries in the temples, flushing of the face, and suffusion of the eyes; shewing very clearly an increase of vascular action in the head. Dr. Whytt asserts, from observation, that the vessels of the membranes of the brain are found to be much distended in animals that have swallowed a large dose of opium*.

When taken to the extent now mentioned, the functions of the brain become disturbed. Stupor, or sometimes watchfulness, takes place. The energy of the *mind* is impaired; the *senses* are dulled; and the *voluntary power* is weakened: these are the *primary* effects of *opium* in the system. The *secondary* or more remote

* Whytt's *Works*, 4to. p. 326.

ones are, headache and prostration of strength, nausea, or at least loathing of food, torpor of the intestines, heat of skin, diminished secretions, whence thirst and foulness of the tongue ; —in a word, a train of symptoms that are hardly to be distinguished from those of *idiopathic* fever generated by other causes ; and indeed there is little doubt that *proper fever* may be actually thus produced, as it is very certainly aggravated by the injudicious use of it.

More sparingly taken, and in states of the system favourable to its operation, *opium* appears simply to *excite* the powers and actions of the brain, and, through this, subsequently, the rest of the system. Hence the mind is exhilarated, and the activity of the body and disposition to motion are increased. As this state, however is a forced one, it cannot be long sustained, but, according to a general law of the system, soon ends in fatigue and *collapse* (to use a term that has often been employed in this sense). The activity of the body declines, the spirits flag, and a state of stupor or sleep succeeds, under which the powers of the system

are recruited, and the effects of the medicine gradually disappear.

Opium, therefore, appears to be *primarily* a *stimulant* with regard to the brain, and to increase its vascular action. This being granted, we can pretty well understand the circumstances in which it is likely to be beneficial, or the reverse, in fever.

The first stage of the disease is commonly a state of active inflammation. The vessels are at this time acting with considerable violence: hence the throbbing of the arteries, the distensible pain and increased heat of the head, the want of sleep, the flushing of the face, and the suffusion of the eyes. In this stage of fever, as in other inflammations, experience has shewn *opium* to be uniformly hurtful. But after the first violence of action has subsided, and the disease has been protracted to a certain period, the same experience proves that *stimulating* remedies can be employed with safety and advantage: and in this stage it is that *opium* is found useful, both in *fever* and other inflammations.

It is not improbable, however, that in cer-

tain cases of fever, particularly in previously debilitated habits, the inflammation is from the beginning of so inactive a kind, as to admit of the early use of *stimulating* remedies; which will account for the success that many practitioners have experienced in the *low state* of fever, from a *tonic* and *stimulant* plan of cure.

As *want of sleep* is justly ranked among the most distressing symptoms of fever, so it is the one which practitioners have in general been most anxious to overcome; and it is with this view principally that *opium* has been administered. Its utility, however, in this respect, is very questionable. It is seldom that sound or refreshing sleep is thus produced; while the future progress of the disease is often rendered by it more unmanageable—to say nothing of its effect in suppressing the natural evacuations. When *opium* is so regulated as to induce *sweating* (as by combining it with antimony, spices, and the like), these disadvantageous effects are in a great measure obviated, and it becomes one of the most powerful means we possess for taking off *fever*, as well as other

inflammations.—The adaptation of this remedy to the various states of fever, the doses and times of exhibition, will be particularly considered hereafter.

It was a favourite practice in the *Royal Infirmary* of Edinburgh, in the Winter of 1802-3, to give every night three or four grains of *hops* in powder, as an *anodyne*, in typhus, instead of the usual *haustus anodynus* of the Infirmary, which contained about twenty drops of the *tincture of opium*. According to the *Clinical Reports*, the *hops* seemed to merit the preference; the patient commonly passing a quieter night, with more refreshing sleep, than when he took the *opium*. The reason was, I have no doubt, that the *opium* often did positive harm; a charge from which the *hops* are certainly free, though it would be difficult to prove that they were productive of any direct advantage. The other substitutes for *opium* that have been resorted to, such as Hoffman's *anodyne liquor*, *castor*, *musk*, &c., scarcely merit notice.

Wine and *alcohol*, which in their effects have a considerable analogy with *opium*, are still

more powerful than this, in increasing the vascular action, both in the brain itself, and throughout the system. Hence they appear peculiarly adapted to the latter periods of fever, when languor and torpor have succeeded to a previous state of violent action: and in such circumstances they are undoubtedly useful.

It is thought by some, that in *fever* the excitability of the body is diminished, so as to render it in a certain degree insusceptible of the action of *stimulant* remedies*. This idea, though by no means universally true, receives some countenance from the large quantities of *wine* that many practitioners have given to patients ill of fever, and, as they assert, with success.

It would seem highly necessary, however, to distinguish between that universal prostration of the powers and faculties of both mind and body (the effect of an apoplectic state of the brain, resembling drunkenness, induced by the violent action of its vessels), which is often ob-

* "In typhus the body is less sensible to the action of opium and wine."—Wilson on *Febrile Diseases*. Vol. 1. p. 500.

served in fevers of the worst kind, at the very commencement of the disease; and that exhausted state of the system, the consequence of previous increased exertion, which occurs towards the end of most fevers of any considerable duration.

In the latter case, the advantage of remedies of the kind we are now considering, is too well ascertained to admit of a question. But in the former, common sense seems to indicate that the use of highly *stimulating* remedies (provided any susceptibility of impression remains,) must tend to aggravate the mischief, by increasing still further the action of vessels in the brain. And this appears to be confirmed by experience: for it is in this state of things that *blood-letting* and other active evacuations, have been employed with such decided efficacy, as already stated. That they should have often failed, cannot excite surprise, when it is considered, how soon the delicate texture of the brain may be destroyed by an excess of its own vascular action.

Camphor, as already observed, has long been

a favourite remedy in fevers, especially those of a *malignant* character. This predilection in its favour, is probably the result of observation. Practitioners, however, are far from agreeing with regard to the general effects of *camphor* in the system; and hence it is not likely that its medicinal powers should be well understood.

By some, *camphor* has been considered a *heating* or *stimulant* remedy; by others, a *cooling* or *sedative* one. It is probably one or the other, according to circumstances. It is acrid to the taste, and leaves a sense of heat in the mouth and fauces. It produces a similar sensation of heat and burning in the stomach, or what is called *heart-burn*. When applied to a wound, it gives pain, and inflames the wound; and when rubbed on the skin, dissolved in oil, it produces inflammation*. These are surely effects of a *stimulant* power.

On the other hand, when given to animals in large quantities, it has often produced sudden death; and, in doses of one or two scruples

* It is denied by Dr. Cullen (*Mat. Med.*, ii. 298) that *camphor* has any such effect on the skin; but this is undoubtedly a mistake.

to man, it operates by first inducing stupor, afterwards delirium, furor, and convulsions*. These effects, which Dr. Cullen considers as "the struggle that takes place between the force of its *sedative* power and the *re-action* of the system," are, I maintain, evidences of its *specific* action on the brain and its functions, and reduce it to the class of *sensorial stimuli*: in which view alone we can understand its operation, either generally, or as a remedy for *fever*.

According to the observation of Hoffman, Cullen, and many other physicians of high authority, *camphor* has little or no tendency to increase the action of the sanguiferous system, nor to augment the heat of the skin. Combined with opium, however, in doses of eight or ten grains with one of the latter, it is one of the most powerful *sudorifics* we possess. In this way, the unpleasant effects which *opium* of itself is apt to occasion, seem often to be prevented. But it is proper to notice the remark of Dr. Cullen on this point, who says, that he

* Cullen's *Materia Medica*. Part 2. chap 6.

has not found that a small quantity of camphor has any effect in rendering the operation of *opium* different from what it would have been if employed alone.

Although the good effects of *camphor*, as a remedy in fever, are sufficiently known in a general way, it is not yet ascertained, I believe, under what particular circumstances of the disease it is likely to be the most serviceable, or the contrary. It has been most frequently employed in the *malignant* forms of fever, that is, in such as are attended with marks of great debility or prostration of strength. But on the other hand, it has been freely given by many practitioners in the most *inflammatory* disorders, as in acute rheumatism: and, as is asserted, with success. There is, therefore, a difficulty here, which further experience only can remove.

Dr. Home gave *camphor*, in doses of five or six grains, in the low *nervous* fever, but, as he thought, without advantage: the pulse continued to become quicker and quicker, till the patients died. The cases, however, were such

as probably did not admit of relief from any remedy*. Dr. Heberden's testimony with regard to this medicine, is not more favourable. He has known, he says, a scruple of it to be given every six hours, without having any perceivable effect in abating the convulsive catchings, or composing the patient to rest.

It was remarked above of the *sensorial agents*, that though they all act *specifically* on the brain, a considerable difference exists between them, in regard to the nature of that action. Some of them appear to affect particularly those parts of the brain which are connected more immediately with what were termed the *vital* functions; others, the *animal*; and others, again, the *natural* functions. This is hinted at by Dr. Cullen in the following passage of his *Materia Medica*, though he does not pursue the idea:—

“May it be supposed,” he asks, “that the *animal* and *vital* functions depend so much upon a different condition of the *nervous system*, that one kind of poison may act upon one of

* *Clinical Hist. and Dissections*, p. 34.

these functions more readily than upon the other, while another kind of poison may act more directly upon that other set of functions, and less upon the former? If there is any foundation for this supposition, we might say that the *narcotic* poisons act first upon the *animal* functions, though their power may, at length, be extended also to the *vital*; and that the *lauro-cerasus*, and other poisons analogous to this, act more immediately upon the vital functions, without shewing any intermediate affection of the *animal**."

If, as is here suggested, the *lauro-cerasus* manifests its effects particularly upon the vascular system, and especially if its action is of a debilitating kind, it would seem peculiarly adapted to the cure of *fever*, which, as I have endeavoured to shew, consists in excessive vascular action in the brain. But this is at present little more than conjecture, which experience must ultimately verify or overturn. It is worth observing, however, that the *lauro-cerasus* has actually been employed with success in certain

* *Treatise on the Mat. Med.*, Part 2. p. 284.

states of fever. Dr. Brown Langrish remarks, that it was in frequent use in his neighbourhood for the cure of *agues*. And Bergius frequently prescribed a strong emulsion of bitter almonds (which, as is well known, produce effects similar to the *laurel*,) with decided advantage in *intermittents*.

But there is another of the *sensorial* agents, the effects of which in diminishing vascular action, point it out as a remedy for *fever*: I mean the *digitalis*, the power of which in reducing the force and frequency of the pulse, is sufficiently ascertained. It is not enough, however, that this medicine is capable of diminishing the general vascular action, in order to establish its character in the cure of *fever*: for such an effect might possibly be the consequence of a previous change induced by it on the *sensorium*, and which in itself might be unfavourable to the disease. We know that preternatural slowness of the pulse, is one of the signs of injured brain. And the same symptom is occasionally observed in *fevers* of the worst kind. The value of *digitalis*, therefore, as a

febrifuge, can only be determined by a knowledge of its effects on the brain itself, or by an appeal to experience.

It seems to be generally imagined, that the *digitalis* acts simply and *primarily* on the heart itself, diminishing its power and activity. But this I believe to be unfounded. I have never seen the frequency of the pulse much reduced by this medicine, without observing at the same time more or less disorder in the functions of the brain. Nor is the pulse simply rendered slower by *digitalis*, but is generally made more or less irregular by it. The pulsations are sometimes found to be pretty equal for ten or a dozen strokes, and then hurried and irregular; so that it beats at the rate of fifty, and immediately afterwards at eighty or ninety, in a minute. The slightest motion of the body, such as merely rising from a chair, and even a deep inspiration, or the act of coughing, is sufficient to raise it twenty or thirty strokes in a minute.

Further, it is not always in our power to reduce the frequency of the pulse by means of

digitalis, by any management of it. It will occasionally produce dimness of sight, *vertigo*, nausea and vomiting, to such a degree as to compel the laying it aside, without having in any degree reduced the quickness of the pulse, and sometimes even with the effect of rendering it more frequent than before.

Digitalis, then, must rank with *sensorial agents*. Like the rest of these, it acts *primarily* on the brain, and through this on the vascular system. In order, therefore, to estimate its value, *à priori*, as a remedy for *fever*, we must endeavour to ascertain its effects on the vascular action of the brain itself; for on this must its influence be finally exerted, in order to overcome an inflammatory state of this organ.

I have watched narrowly and repeatedly the effects of *digitalis*, when it has been carried the length of inducing restlessness, *vertigo*, and impaired vision, without having observed that throbbing of the arteries, tensive pain of the head, and flushing of the face, which occur from the excessive use of *opium* and *alcohol*, and which denote an increase of vascular action in

the brain. On the contrary, the face in such cases is pale, the eyes are sunk and languid, and headache, which was before troublesome, has often ceased.

This, I admit, is only a probable indication of the state of action in the ultimate or capillary branches of the arterial system, which appear to be the immediate seat of inflammation ; for it is possible that the capillary vessels may be so acting, as even to destroy the texture of the part, without any remarkable increase in the action of the larger arterial trunks. And in this way, I conceive, parts are frequently disorganized by chronic inflammation. But, at all events, the effects of *digitalis* are considerably different from those of *wine* and *opium* ; and it is probably, therefore, adapted to circumstances of the disease, where these would be less proper.

On all accounts, I think *digitalis* entitled to the notice of physicians, as a remedy for fever, whether we consider its general effects in the system, or its efficacy in the cure of various inflammations. I have also myself employed it in

several cases of *typhus*, and am satisfied of its utility. I have also used it with apparent advantage in many cases of the *acute hydrocephalus*, the fever of infants.

The fate of this plant has been very similar to that of many other active remedies, which, after going into disuse for a long time, has been again revived in practice. The *digitalis*, we are informed by the old writers on the *materia medica*, used formerly to be a domestic medicine in the country in *pectoral* disorders. Ray says, the common people in Somersetshire employed a decoction of it in fevers, and that it operated both upwards and downwards*. It has also been celebrated in *epilepsy*, a disease which, in its seat and origin, has a near relation to fever, of which it is both a frequent precursor and consequence.

There are still others of the *sensorial agents*, which, by their property of reducing the vascular action throughout the body, and even in

* "Somerseti Angliæ rustica turba hujus decocto febricitantibus, purgationes et interdum superpurgationes et vomitiones humidioribus alvo molitur."—Raii Historia Plantarum, art. Digitalis,

the brain itself (as is evident by the paleness and faintness that attend their operation), promise to be valuable auxiliaries in the cure of fevers, especially such as are attended with marks of strong vascular action in the brain: such is the *nicotiana*, which, in a full dose, enfeebles, even more than the *foxglove*, the action of the heart and arteries. In hot climates, where the progress of fever is so rapid and destructive, the use of such herculean remedies is fully justified. Where so little time is allowed for the operation of medicine, the most powerful agents should be had recourse to; and none seems better entitled to notice in this respect, both by the celerity and the force of its action, than the *nicotiana*. In an *inaugural Dissertation*, published at *Philadelphia*, in the year 1804, by Mr. Stubbins Firth, House Surgeon to the *Philadelphia Infirmary*, frequent clysters of the *infusion of tobacco* are recommended in *yellow fever*; and the author says that he never knew it fail.

Among the minor remedies for fever, derived from the class of *sensorial agents*, the agreeable

effects of *green tea* ought not to be wholly overlooked. The tendency of this to relieve the headache, and other consequences of inebriety, are well known. And the stupor of fever which, as we have seen, is nearly allied to intoxication, might admit of relief from the same means. Habit, it is true, has so reconciled most of us to the agency of *tea*, as to render it in a great measure inert: but this, probably, might be compensated by an augmentation of the dose.

I might have mentioned among *sensorial agents, mental emotions*, but that they are scarcely applicable to practical purposes. The influence which they occasionally exert in fever is, indeed, sufficiently known. *Terror* has often prevented the recurrence of the paroxysms of *intermittents*: in *continued* fevers, it has been supposed to be detrimental. I know not whether a fact mentioned by Dr. Jackson, respecting the good effects of *gestation in the open air* in fevers during a severe season in America, is to be referred to this head of *mental excitement*;

or whether the effects of temperature and pure air are not to be taken likewise into account.

In support of the former idea, may be mentioned the good effect of endeavouring to rouse the attention of persons stupefied by large quantities of *opium* and the like, and not suffering them to yield to the almost invincible propensity to sleep that takes place. Dr. Hartley gave *nux vomica* to a dog, and then beat him severely. The *sensation* thus excited, and probably also the effect of *fear* on the mind of the animal, prevented the operation of the drug, and no disorder ensued. Dr. Darwin relates a somewhat similar case. Two dysenteric patients in the same ward of the Infirmary at Edinburgh, quarrelled, and whipped each other severely with horse-whips: and it was observed, that both of them were much better of the dysentery afterwards. Such an application would probably be at least as innocent, and a much quicker means of exciting a patient in the stupor of *fever* (if excitement were necessary,) than *blistering*, which is often carried to such an unmerciful extent.

It may be remarked of many of the *sensorial agents* above enumerated, as remedies for *fever* that they are also capable, under certain management, of *exciting* the disease ; becoming either a *cause* or a *cure*, according to their administration. Thus we have seen that *mental emotions* are sometimes the cause of *intermittents*, while the same stimulus has repeatedly removed them*. *Cold*, which, as far as regards sensation, is perhaps to be ranked with *sensorial agents*, frequently induces fever, and is at the same time among the most powerful of its remedies.

The exhalations of the *datura stramonium* (thorn apple,) occasion headache, with febrile symptoms ; and in some parts of America, where this plant grows in great abundance, the occurrence of the *remittent fever* is ascribed to that source. This opinion is so prevalent that a law has been passed in one of the States, for extirpating the plant altogether†. Such an

* See page 109.

† See a *Collection of American Medical Theses for the Year 1805*. By Dr. Charles Caldwell, of Philadelphia.

opinion does not appear without foundation, nor exceedingly improbable, when the effects of this drug are considered as taken into the stomach. A few grains of the powdered leaves of the *stramonium* excite headache, stupor, convulsions, and sometimes *mania*. A single drop of a weak infusion of it *, put into the eye, is sufficient to dilate the pupil in the space of an hour or two, to such a degree as almost to obliterate the *iris*, attended with a sense of heat and pain in the head, and a degree of stupor that lasts for many hours ; as I know by trials on myself and others.

* Two scruples to half an ounce of water.

SECT. XXXIV.

OF COLD AS A REMEDY FOR FEVER.

WE are next to consider one of the most powerful, but at the same time, perhaps, the least understood, of the agents employed in the cure of fever. Although it be true, in a *physical* sense, that *cold* is merely a negative term, implying only a privation or diminution of heat, it cannot be viewed in this light as applied to the living body, but must be considered as a positive agent, having, like other agents, a power of changing materially the condition and actions of the system. Its effects are by no means merely a lower degree of those which heat produces, but often of a totally different kind.

The effects of *cold* on the system are various, according to the mode of its administration, time, degree, and other circumstances. The discussion that has taken place, and been car-

ried to such an unprofitable length, with regard to the question of its *stimulant* or *sedative* operation, appears to me to have been wholly useless; since it acts so very differently in the different circumstances above alluded to, that nothing but observation can bring us acquainted with its true powers. I propose, in the first place, to consider its effects in the state of health, both as regards the part to which it is immediately applied, and the general system; and afterwards its effects as a remedy for inflammation. This will lead us, if I mistake not, to understand, in some measure, its influence on the course of *fever*.

Cold affects both the *sensibility* and *irritability* of the body; in other words, it both excites *sensation*, and influences *action*. There are some parts, however, which appear to be in a great measure insensible to its impression as far as concerns sensation; whether from habit or original constitution I know not. Thus, *cold air* is not felt in the lungs in breathing, though it may act on them in other respects so forcibly as to excite disease; but its first im-

pression is unattended with the *sensation* of cold. And the internal surfaces in general have a very indistinct, if any, feeling with regard to this agent.

The effects of *cold* in exciting *sensation* in a part, are, according to the intensity of the application, the novelty of it, and the natural *sensibility* of the part. Like other agents on this function, its effects are diminished by repetition and habit. Thus the face, by repeated exposure, becomes insensible to degrees of cold, that, when applied to other parts, excite a high degree of sensation, amounting even to pain.

But *cold*, as before observed, not only influences the *sensibility* of parts, but their *moving powers* likewise. It not only produces a condensation, or simple diminution of bulk, as in inanimate bodies; but occasions permanent contraction, the result of living action. This is very evident in the skin, which, when corrugated by cold, has a totally different appearance from the cold or frozen surface of the dead body.

The effect of this *vital* contraction, when

considerable, is to diminish the oscillatory action of the blood-vessels, and to impede the passage of the blood through them. Hence its effects in suspending, and sometimes in stopping altogether, the process of inflammation, which is always accompanied with violent vascular action in the part affected.

Such are the *first* and most obvious changes induced by *cold*, on the parts to which it is immediately applied. Its *secondary*, and, on this occasion, most important effects on the general system, remain to be considered.

As exciting *sensation*, *cold* is undoubtedly to be ranked with *sensorial agents*; like which, it is capable of influencing very powerfully the *sensorium*, and through it the rest of the system. The effect exerted by it on the brain, when applied to a different part, is in a compound ratio of the *intensity* of the application, the sensibility of the part to which it is applied, and the *disposition* of the brain to be affected by it. Hence, as the susceptibility differs in different persons, the effect of an equal application of *cold* is not the same in any two individuals.

When *cold* is applied in a low degree to the surface of the healthy body, so as to be within the limits of pleasurable sensation, it appears to *excite* the energy of the brain, and subsequently to invigorate the whole system. Hence the grateful and refreshing effects of the Summer breeze. Applied in a higher degree, it produces pain or a sensation of uneasiness in the part, and, at the same time, disturbs and diminishes the energy of the brain. This is manifest in the debility of the *voluntary muscles*, which tremble, and can scarcely be made to obey the will; and in the general *torpor* of the body, which, under a more intense application of the cause, terminates at length in a state of total insensibility.

The change thus induced on the brain appears to consist in, or is accompanied by, a diminished action of its vessels; as is rendered probable by the paleness of the face, and shrinking of the features, which attend the application of extreme cold.

This torpid state of the brain is sometimes succeeded by inflammation: just as happens to

external parts, after having been exposed to a diminished temperature. A disease then takes place, which has been called either *fever* or *phrenitis*, according as one set of *sensorial* functions, or another, is observed to be peculiarly affected.

When the *mental* powers are most strikingly and primarily disturbed, the affection has been named *phrenitis*, or simply *inflammation of the brain*. Where the affection of the mind, or delirium, is later in coming on, and is of a less active character; and where, at the same time, the *voluntary power* is much weakened; it has been usually called *fever*, in which the inflammation of the brain, from the absence of the most acute symptoms, has generally been overlooked. And, when both *mind* and *body* are observed to be pretty equally disordered, the disease has received the compound denomination of *brain-fever*. But all this, it is evident, is entirely arbitrary.

There is a third, and more remote, series of changes induced in the system by the application of *cold*, which are to be ascribed to the

previous change induced on the brain, and upon which they immediately depend. These are, a diminished action of the heart and arteries, as shewn in the smallness and feebleness of the pulse, and a derangement of other organs, according to their disposition to be thrown into irregular action.

These effects of *cold* on the brain and general vascular system, take place to whatever part of the surface the application is made; but the more so, in proportion as the *part* is less accustomed to it. *Habit* so far reconciles us to the impression of this agent, that a degree of *cold* which, when applied to the face, scarcely excites sensation, produces its full effect applied to parts that are usually defended from it.

This seems to render it doubtful, whether the common idea is well founded, that *cold* applied to the head itself, is more effectual in restraining immoderate action in the vessels of the brain, than when applied to more distant, but more sensible, parts. The scalp is (from habit) one of the least sensible parts of the body with regard to the impression of *cold*; while we

know that the full operation of this agent on the brain, can be produced by its application to very distant parts of the system.

A considerable difference is observed in the effects of *cold*, according as its application is sudden and intense, or more moderate and long continued. In the former case, the effect is greater, but at the same time is commonly transitory: and very often the parts whose actions were suppressed or diminished, while under the influence of the *cold*, act afterwards with greater energy than before. This is what is called the *re-action* of the system, and takes place equally with regard to the three series of actions before mentioned; which seems to shew, that the *primary* change induced in each case is the same, viz., a diminution of vascular action. Thus the paleness and shrinking of the surface—the diminished energy of the functions of the brain—and the reduced action of the heart and arteries, which follow the *temporary* application of the *cold bath*, are succeeded by an unusual glow on the surface, increased muscular vigour, and a strong and full pulse.

When *cold* is applied in this sudden and transitory way, to parts already in a state of inflammation, the *re-action* which succeeds to the previous state of torpor, sometimes aggravates the disease ; as in the case of *burns*, which are relieved from pain by a *temporary* application of *cold* ; but if this be soon withdrawn, the pain returns with greater violence than before. And in order to produce permanent benefit in this case, the application of *cold* must be continued, till the *disposition* to increased action afterwards ceases ; an effect which, in the case of burns, often requires a period of many hours to accomplish.

We are now, I flatter myself, prepared in some measure to comprehend and estimate the value of *cold* as a remedy for fever, a remedy concerning which, and its mode of acting, many doubts and disagreements among practitioners still subsist. I shall not enter further into the history of the subject, than to observe, that the practice is of great antiquity, though modern writers have contended for the honour of the discovery.

Cold has been employed in two very different ways in the cure of *fever*; the one, its sudden but temporary application, as by the *cold bath*, or the *affusion of cold water* over the body;—the other, the gradual and long-continued exposure of the patient to *cool air*, the washing the surface of the body or limbs with *cold* or *tepid* liquids, and the exhibition of *cool drinks*.

In the former way it seems to act by its sudden impulse, and not by the mere abstraction of heat from the body, as Dr. Currie seems to have supposed. In this respect it ranks with *emetics*, *mental emotions*, and other sudden and violent impressions; which are found occasionally to interrupt the progress of *fever*, as well as many other diseases. The effect of the application, in this case, is almost immediate; the disease has been often thus cut short at once. A disposition to sleep and sweating has succeeded, and the patient has awoke almost free from disease.

By the other mode of applying *cold* in *fever*, viz., by exposure to *cool air*, the use of *cold*

drinks, and sponging the surface with cold or tepid liquids, the preternatural heat of the body is gradually abstracted, and thus the most prominent symptom of *fever* is relieved. But it is not by the simple abstraction of heat from the body, that this mode of cure produces its good effects in *fever*, but by the reduction of vascular action; first, in the skin; secondly, in the brain, by sympathy; and lastly, in the general system. Thus the action is destroyed, upon which the excess of heat (which is merely a symptom) depends.

It was for many years a practice of Dr. Gregory, the late eminent Professor of the Practice of Physic in Edinburgh, in addition to the exposure of the patient to *cool air* in *typhus*, to direct the whole body to be washed with a sponge dipped in cold vinegar and water; with the effect of reducing the pulse in many cases, from 110 to 90 strokes in a minute. This fact is not difficult to be understood, when it is considered that the skin is an *organ of sense*, and therefore intimately connected with the brain; and that by inducing torpor in the one, we di-

minish the energy of the other, and, subsequently, the irritated vascular action of the whole system.

With regard to the comparative merits of the two modes mentioned, of applying *cold* in fever, we must appeal to experience. The *affusion of cold water*, or the *cold bath*, so strongly inculcated by Dr. Currie, in his valuable publication on the subject *, has so often succeeded in immediately arresting the progress of *fever*, as proved by his own experience as well as that of many other unprejudiced observers, that the practice appears to merit more attention than it has yet received.

It is to be observed, however, that neither this, nor any other of the remedies employed in the cure of *fever*, effects its purpose with certainty ; and it consequently becomes a question of no small moment to determine, whether in case of failure, the patient is put into a worse situation, with regard to the future progress of the disease, than if no attempt had been made to

* *Reports on the Effects of Water, cold and warm, in the Treatment of Fevers.* By William Currie, M.D.

cut it short. This point, I think, we have scarcely yet grounds for determining satisfactorily.

If we rely implicitly upon the reports which have hitherto been made on the subject, we must believe that the practice, even where unsuccessful, is never attended with disadvantage, but is rather favourable to the subsequent progress of the disease. Experience, however, has taught us to make some allowance for reports of this description. The discoverers of new remedies, or the advocates of revived modes of practice, have rarely shewn themselves competent to fix the proper limits to their application. And we have yet had the experience of few others, with regard to the point before us.

I have seen the *cold affusion* in *typhus*, and even sponging the surface of the body with vinegar and water, excite, in different instances, pulmonic inflammation and rheumatism: but I have not in general observed that the situation of the patient was rendered materially worse by the combination. It is even probable, that such a combination may, by *counter-irritation*,

tend in some cases to relieve the primary affection. "One circumstance not a little remarkable was," says Dr. Sims, "that some of those who were exposed to *cold* (in *fever*) were seized by an immediate cough from it: this I always found a certain sign of a speedy recovery. The same thing I have often noticed towards the end of other fevers, when I did not with certainty know the cause, and cannot recollect a single instance of the disorder afterwards terminating fatally*."

I have not in any case observed the *secondary* disease, thus induced, occasion an entire cessation of the *fever*. The two affections have gone on together, for a time, evidently modifying each other. Thus there have been observed the usual *pulmonic* symptoms of cough, pain, and difficult respiration, joined with the symptoms peculiar to *idiopathic* fever, as headache, prostration of strength, and a brown furred tongue. When *rheumatism* supervened on fever, the disturbance in the functions of the brain peculiar to the latter, continued; but the

* *Op. cit.*

general vascular system was at the same time excited into a degree of action unlike what is ordinarily observed in *low fever*, and approaching to that which accompanies acute rheumatism.

These combinations of disease, I had many opportunities of witnessing in the Royal Infirmary at Glasgow, in the Winter of 1803, where they occurred so frequently as to have brought the practice of *cold affusion* into some degree of disrepute. It is not improbable indeed, from analogy, that other combinations of disease, more formidable than those now mentioned, such as inflammation of the abdominal viscera, may be occasionally produced by this practice.

Occurrences of the kind above alluded to, and the fear (perhaps ill-grounded) of others still more formidable, have prevented hitherto so general an adoption of the *cold affusion* in the treatment of fever, as the respectable testimony adduced in its favour would seem to warrant. Practitioners in general, still prefer trusting the cure of fever to remedies that are less

revolting to vulgar opinion. This may be justifiable with regard to the fevers of *temperate climates*, where the risk to life is comparatively small; but in those of the *torrid zone*, which so soon terminate in *disorganization* and death, the use of means capable of arresting their progress (though eventually attended with some degree of hazard and uncertainty) is fully justified.

The probability of immediate success from the *cold affusion* in fever, depends almost entirely on its early administration. It rarely succeeds after the disease is fully formed, or has already subsisted for several days. This is an additional reason for believing, that it effects its purpose by *counter-irritation*, or the shock that is given to the system, and not simply by reducing the excessive temperature of the body.

With regard to the more moderate and continued application of *cold* as a remedy for *fever*, it would be superfluous to adduce proofs of its utility: and its mode of acting, after what has been already said, cannot, I think, be obscure. If *fever* depend upon inflammatory ac-

tion in the vessels of the brain, the application of *cold* to the surface of the body is a probable means of lessening such increased action, and of relieving, in consequence, the different symptoms which result from it. And though it be not capable of suddenly interrupting the progress of the disease, there is no doubt that, by moderating the violence of the local morbid action going on in the brain, it checks the tendency to disorganization in the part, and thus conduces in no small degree to a favourable result.

One effect of the application of *cold* to the surface of the body, is a change in the general distribution of the blood; the *cold* acting as a *repellent*. Hence, fears have been commonly entertained, of cold throwing the blood with injurious violence upon the brain; so that while the propriety of cold applications to the head itself, in inflammatory affections of this part, is generally admitted, it is usual at the same time to direct warm fomentations to the extremities, or the warm *pediluvium*, with the view of determining the force of the circulation towards these parts.

The fears, however, which are entertained on this head, I cannot but think, are in a great degree imaginary. The change in the distribution of the blood, produced in this way, lies chiefly between the capillary system of vessels generally, and the large vessels about the heart.

The constriction produced by the partial application of cold to the skin, is readily extended to the whole surface; and it is not improbable that a corresponding effect is produced on the capillary system in general, internal as well as external; and, of course, in the brain, as well as other parts. It is at all events certain, that a considerable application of *cold* to the surface of the body induces torpor of the brain, and impedes the due exercise of its functions.

On the other hand, the effect of the *pediluvium*, or of warm fomentations to the extremities, is not merely that of increasing the circulation in those parts, but it operates forcibly as a *stimulus* to the brain, increasing its energy, and, in a short time, the vascular action throughout the system: as is evident by the increase of the heat of the body, the fulness of the pulse, and

the production of sweat, which soon follow. It produces, in fact, as might be expected, consequences the reverse of those which are induced by *cold*.

In this point of view, the practice of applying *warm fomentations*, and the like, to the extremities in *fever*, seems to be equivocal, and only adapted to that state of things where a *stimulus* to the brain is clearly indicated. I have repeatedly seen reason to believe, when *warm fomentations* have been employed early in *fever*, for the purpose of relieving a more than ordinary affection of the head (such as violent delirium), that they have seemed rather to aggravate than mitigate a symptom, which owed its origin to an already too active state of vascular action in the brain.

If remedies of this description are proper in *fever*, it must be towards the close, or under circumstances in which *wine* and other *stimulants* become useful. And the same, probably, may be said of *blistering*, and the other means of exciting inflammation on the skin.

SECT. XXXV.

OF THE USE OF MERCURY IN FEVER.

THE last remedy I shall have occasion to notice at present, for the cure of *fever*, is *mercury*, a medicine whose herculean powers have made it be resorted to in many desperate cases of disease, as a forlorn hope, and without any particular or intelligible indication.

The good effects of *mercury* in fever have been most experienced in the fevers of tropical climates; in which may be included even the Northern States of America, since their Summer diseases bear so strong a resemblance to those of the West Indies. Almost all the writers on the diseases of hot climates, concur in sentiment with regard to the utility of this remedy. It has been employed in different forms, as by *inunction*, by giving *calomel* internally, and sometimes in the form of *sublimate*.

Some practitioners have given *calomel* in

combination with other remedies, as *antimony*, or *opium*; and have believed that its good effects were thereby much enhanced. Mr. Tainsh, a Navy surgeon, who treated a number of cases of *the plague* on the coast of Syria, at the celebrated siege of *Acre*, in the year 1799, remarks, that the good effects of *calomel* and *antimony* were decisive. After an *emetic*, he gave ten grains of *calomel*, and six of the *antimonial powder*, every four hours, till the fever abated: when the *bark* was given, with wine*.

Mr. Milne, in his account of the diseases which prevailed on board ship, in two voyages to the East Indies, in the years 1793-8†, says that he gave *calomel* and *antimony* with great success, in the cure both of *dysentery* and *fever*. In the latter disease, six grains of *calomel*, with four of the *antimonial powder*, were given night and morning; which generally, he says, occasioned three or four stools. This he continued, unless the feverish symptoms disappeared, till the mouth became affected, when the symptoms

* See *Medical and Chirurgical Review*, Vol. 8. p. 85.

† 8vo, London, 1803; Published for Philips.

were found, for the most part, to be removed. He followed the same practice in *intermittents*, and with equal success. The patients, he adds, never complained of being weakened by these evacuations; and, by particular attention to their diet, none of them relapsed.

Mr. Beane, in the fever of *Demerara*, after *bleeding* and *purgings*, gave mercury, which, when it excited salivation, never failed to cure. On dissection of a case which terminated fatally, patches of inflammation were observed on the *pia mater*, under the temporal muscles; water was collected between this membrane and the *arachnoid*, and in the ventricles. And points of bleeding vessels were seen in the medullary substance of the brain*. This case at once illustrates the theory I have ventured to advance, and confirms the practice deducible from it.

Mr. Lempriere, who practised in Jamaica, finding that *calomel* was often exhibited in immense quantities, without exerting any apparent action, was induced to employ the

* See *Mem. of Med. Soc. of London*, Vol. 5. art. 35.

sublimate, in doses of the eighth part of a grain, with the addition of ten drops of laudanum. These were given every hour, until some affection of the mouth was observed, or until the more alarming symptoms had considerably abated; when they were administered at more distant intervals, or omitted altogether. The *tincture of opium*, combined with the mercury, did not appear, he says, to affect the head, even when given in very large doses. *Mercury* was given in this way to fourteen patients labouring under the *tropical continued fever*, two only of whom died, and these had been ill two or three days before the remedy was administered*.

But it is not in the fevers peculiar to tropical climates alone, that *mercury* has been found serviceable. The author just quoted observes, that the *typhus*, or *contagious fever*, required much the same general treatment, with a freer use of *stimulants*, and a generous diet.

Dr. Wright, who practised extensively both in the West Indies and in Europe, by no means

* *Practical Observations on Diseases of the Army of Jamaica*,
By William Lempriere, Apothecary to the Forces.

limits the use of *mercury* to the former. He gave *calomel* in *typhus* in Scotland, where there was any reason to suspect visceral inflammation, but in less doses than in the West Indies. He seldom exceeded, he says, five or six grains daily in Europe, while in the West Indies he gave twenty grains within the same period.

The practice of the late Dr. Geach, of Plymouth, a physician of great and merited reputation, is highly deserving of notice; and the practice, as appears from the best testimony, was not more bold than successful. The account of it is given by Mr. Stephen Hammick, Jun., Dr. Geach's assistant in the Naval Hospital†.

“Whenever,” says Mr. H., “the Doctor was called to a person labouring under symptoms of *typhus fever* (if within two or three days of its first attack), he used constantly to prescribe fourteen or sixteen grains of *ipecacuanha*, as-

* See a paper by this Gentleman in *Med. Facts and Obs.* Vol. 7.

† See Dr. Beddoes's *Western Contributions*, p. 380.

sisting its operation with camomile tea. Three hours after the cessation of the vomiting (if the patient was delicate), a bolus of five grains of *calomel*, with a scruple of rhubarb, was given; but if the patient was of a strong habit, a scruple of jalap, with eight or ten grains of *calomel*, were administered. If evacuations were not thus produced within eight or ten hours, *castor oil*, or some other laxative, were given occasionally, till the desired effect had taken place. The windows of the room were opened in such a manner, that the room was kept perfectly cold, without subjecting the patient to a current of air; the bed-curtains nearly all withdrawn, so that free circulation was admitted, even in Winter; taking care to have (where it could be procured,) frequent changes of linen. After the stools, the following boluses were immediately ordered:—*calomel* eight grains, *pulv. antimonial.* four grains, *cons. cynosb. q. s. ut f. bol.*; to be taken every six hours when the symptoms were slight: but when the case was very urgent, or he had not been called in till the fever had made some progress, then the above quantity was

given *every four, three, or even every two hours*; permitting weak lemonade, tamarind, or cream of tartar water, to be taken for the common drink. If the fever still went on, and the patient's strength became exhausted, a little *port wine* diluted with water was allowed; usual quantity half a pint, seldom or never exceeding one pint, in twenty-four hours. To any person unaccustomed to give these boluses, *diarrhœa*, *ptyalism*, or *vomiting*, would naturally suggest themselves, as the inevitable consequences in almost every case of their exhibition; but the fact, in a multiplicity of instances, directly proves the reverse; for in general we are obliged to order a little *castor oil*, *rhubarb*, with *kali ppt.*; or an electuary, made of equal parts of *cream of tartar* and *conserv. cynosb.* *Ptyalism* has seldom, as I have before said, followed their use, notwithstanding they have been continued to some patients every three hours, for eighteen or twenty days; but when they did affect the salivary glands, the cure was always certain and expeditious after that event, appearing to check immediately the progress of

the disorder. When *diarrhœa* supervened, the Doctor was cautious how he checked that discharge, never attempting it unless the patient was very feeble or low ; for in several instances where numerous stools have been procured, the patients have found themselves relieved of a delirium, which had been on them for three or four days before ; but when the *diarrhœa* continued profuse, exhausting the patient's strength, then means were employed for its removal : commonly a scruple of *conf. opiat.* or an ounce of *poppy syrup*, sufficed : if they did not, half a grain or a grain of opium was combined with the *calomel* and *antimony* ; but seldom were we necessitated to seek the assistance of *opium*, and in no other way did the Doctor ever administer *opium* in this disease. *Vomiting*, when excited, was commonly allayed by the saline mixture, in the state of effervescence ; when this symptom much harassed the patient, the *antimonial powder* was reduced from four to two grains. This was the system pursued throughout the whole of the stages of this fever ; never administering any other medicine, unless

any extraordinary occurrence took place: therefore the whole dependence for a cure, may be clearly perceived to be entrusted to the *calomel* and *antimony*. In some few cases, when delirium was great, and the head much affected, a *blister* was applied to the nape of the neck; as soon as signs of amendment appeared, the boluses were discontinued, *and not till then*. A little mutton broth or jellies were allowed, and a *decoction of bark* with *bals. tolu*, was given; but the *bark* in substance was never given by the Doctor; for the bad effects of it in this form, when exhibited to weak stomachs, far outweighed, in his opinion, any good it ever produced. It is well worthy of remark, that in all those cases where the symptoms were very urgent, and the *putrid* appearances more apparent, that there the boluses scarcely ever were observed either to ruffle the bowels or stomach."

Dr. Geach, it seems, was led to this practice at first, about thirty years ago, whilst attending the crew of a large Russian ship, which had been driven into the port of Plymouth in the greatest distress. After encountering several

gales of wind, her people, from great fatigue and uncommon exertions, had become very sickly, and the *typhus* fever raged among them with much violence, accompanied with symptoms of great *malignity*. He then observed, that the only men who escaped the *contagion* on board, were men under the influence of mercury, which they had taken for the cure of the *lues venerea*. This fact made a great impression on his mind: and ever after that time he was accustomed to give *mercury* in such fevers, though not with so much freedom till the last seven years of his life.

With regard to the prevention of fever by *mercury*, I must observe that it is not universal; as more than one patient died of fever caught in the Royal Infirmary at Glasgow, in the winter of 1803, while under the full influence of *mercury* for the cure of *sivvens*. I was informed, however, by Mr. Wachsel, the late Resident Apothecary at the Small-pox Hospital, that persons under the influence of mercury have been found, in repeated instances, to resist variolous infection.

The cure of fever by *mercury* is analogous with its effects in many other inflammations, particularly those of an inactive kind, and which do not well bear large evacuations. "Nothing embarrasses more," says Dr. Gilchrist, "than inflammation in a low state: but *quicksilver* is a powerful *antiphlogistic*, and removes inflammation without accelerating the motion of the fluids, which it rather diminishes by subduing their inflammatory disposition, when there is little or no fever." The late Dr. Clark, of Newcastle, was accustomed to employ *mercury* in various inflammations, as well as in *remittent* and *continued* fever, and had great faith in its efficacy. He gave it particularly in *dysentery*, and in *acute rheumatism* *.

Among other testimonies that have been given in favour of *mercury*, combined with *opium*, in inflammatory diseases, I shall only refer to a paper published in the 9th vol. of Dr. Duncan's *Commentaries*, written by Dr. Hamilton, of Lynn. This gentleman administered it in pneumonic inflammation, in acute rheu-

* See Fenwick's *Life of Clark*.

matisms, and, in short, in inflammations in general, both external and internal. The dose usually given was from one to five grains of calomel, with, from a quarter of a grain to a whole grain of *opium*, according to the age and strength of the patient, every six, eight, or twelve hours. The medicine was thus continued until the disease was resolved, either by sweating, purging,^a or more commonly both: or by ptyalism being raised. *Blood-letting* was premised and repeated, in cases that seemed to require it. More lately, Dr. Yeats, of Bedford, has given his testimony to the utility of the same plan of cure*.

It is not merely of late years that *mercury* has been held in esteem, in the cure of fevers and inflammations; as will appear from the following references, for which I am indebted to Dr. Beddoes†. “There seems every reason to suppose that *mercury* has continued more or less in use in fevers and in *pyrexia*, since the rise of the alchemical sect, or before. In gout and *rheumatism*, and other complaints, it is

* See a paper in Dr. Duncan's *Annals of Medicine for the Year 1802*.

† *Western Contributions*, p. 466.

much recommended in F. Hildanus, and Zac. Lusitanus. Boerhaave thought highly of it in *small-pox*; English medical writers, a century ago, in inflammations. Its external and internal use in cattarrh, inflammations, and proper fevers, grew very common among Italian practitioners in the earlier half of the present century, as may be seen at large in *Rotario Remedio alle catarrali molestie e a qualsivoglia infiammazione, Verona, 1733*; and in *Moreali Systema Februm malignarum Mutinæ, 1739*. Some time afterwards, we find *bleeding* and *mercury* employed in fevers in Italy full as freely as of late in the West Indies, or in America, only that bark was sometimes largely added to the *mercury*. Benvenuti (*diss. qua epid. febres describuntur. nec non et cort, p. usus Luccæ, 1754.*) describes a *fever*, attacking particularly full and robust young people. Dissection shewed either inflammation or mortification of the meninges of the brain, of the stomach, bowels, or liver. At the onset, *copious bleedings* were ordered, and three or four times repeated. Then *lenitive electuary*, with two

scruples of *mercurius dulcis*, was given, by which means Benvenuti restored many to their pristine health. When this plan did not answer soon, a drachm of bark was added to a scruple of the *mercury*, and of this powder a scruple taken every four hours for three days, when the fever commonly disappeared. In desperate cases, he gave three drachms of bark, with one drachm of the mercury at once. In this way, he says, he cured many patients ; his success he ascribes principally to the *mercury* ; and declares he never observed any bad consequence from the practice. A great deal of information may be found in the following learned dissertation :—

J. J. Rambach *Usus mercurii in morbis inflammatoriis. Halæ, 1794.*"

Thus there appears to be very satisfactory evidence of the utility of *mercury* in *fevers* of various descriptions, as well as in other inflammations. Its mode of acting, however, is not so clearly ascertained. It seems to be not altogether agreed, whether *mercury* is to be looked upon as an *evacuant* merely in fever, or as operating *specifically*, by its well known faculty of

superseding various diseased actions in the system. In many of the instances of its employment above recited, we find it not only producing copious evacuations by stool or vomit, but purposely combined with *emetics* and *cathartics* of the most active kind. This, however, is no argument against its *specific* operation; for *calomel* frequently induces salivation, at the time that its *purgative* effects are most conspicuous; as I know by repeated observation.

It has been remarked by several of those who have employed *mercury* in the cure of *fever*, that its good effects were always most apparent when *salivation* took place, an effect that it was often found exceedingly difficult to bring about. But neither is this decisive of the question. For in the worst cases of fever it could not, in the largest doses, be brought to affect the mouth, so extreme was the torpor induced by the disease; while, in milder cases, the *mercury* was found to exert its usual action. The appearance of *salivation*, therefore, and the cure of the fever afterwards, might be only indications of a milder state of disease*.

* It is certain that the system, in *malignant* fever, is often,

It is, however, I think, most probable upon the whole, that *mercury*, when freely and repeatedly administered, operates with advantage in the cure of fever, both as an *evacuant*, and by its *specific* powers. We see that, on some occasions, it exerted little or no evacuant effect; and the *sublimate*, which is not remarkable for its purgative properties, was found to be attended with the same advantage as *calomel*.

Mercury certainly exerts peculiar effects on the brain; and it is probably through the influence of the brain, thus irritated, that the general febrile state is produced, which is so commonly observed under the free use of *mercury*, and not by the immediate application of the medicine to the heart and general vascular system. Dr. Adams, remarking on its use in the cure of *syphilis*, says, “ the fever it produces

to an astonishing degree, insusceptible of the action of *mercury*, and various other *stimuli*: and I do not see how this extraordinary torpor is to be explained, but upon the principle I have laid down, of a topical derangement of the *sensorium*. Such a condition of the system, we well know, is induced by *hydrocephalus*, a disease that owes its origin to inflammation in the brain.

may be truly called *specific*, from its uniformity and total difference from all others *."

Moderately used, *mercury* often relieves headache depending on local increased vascular action; and it is considered as *specific* in the cure of that variety of inflammation of the brain or its membranes, which is improperly called *hydrocephalus*. It has often, also, removed *gutta serena*, epilepsy, and other *sensorial* affections. Employed so as to excite salivation, it has frequently contributed to the cure of obstinate *intermittents*, by rendering them obedient to the Peruvian bark †, which they had before resisted; and it supersedes various other diseases that are kept up by an acquired habit.

When mercury is used in excess, it produces headache, general debility, incapacity for mental exertion, and finally, in many instances, mania; effects that very clearly demonstrate its influence on the sensorium. We are prepared, therefore, to expect that it will be hereafter resorted to with more confidence as a remedy for

* *Essays on Morbid Poisons*, 4to. p. 86. 2d edit.

† Dr. Donald Monro. *Medical Transactions*, Vol. 2. p. 325.

fever; though, as happens with regard to most others, we have yet much to learn of the circumstances which should in all cases govern its administration.

SECT. XXXVI.

OF THE SPONTANEOUS TERMINATION OF FEVER.

AFTER all that has been said respecting the cure of *fever*, by the different methods pointed out above, it is important to bear in mind, that, while the disease, when once fully established, is with difficulty interrupted in its course, it has, at the same time, a strong disposition to terminate *spontaneously*, after going through certain stages. In this respect, there is an entire accordance between it and inflammation in general, which serves to support the analogy between them. It is well known, that either from negligence or other causes, inflammation of all kinds is in a great proportion of instances left to itself, without any means being employed for its relief; the result, nevertheless, is often as favourable as could be wished.

The circumstances attending the *spontaneous* subsidence of the disease, both as regards

the general disorder of system, and the changes induced on the part itself, are, in both cases, nearly alike. The *pyrexia*, or general febrile action, both in *proper* fever and in ordinary inflammation, terminates, for the most part, in *sweating*, provided the patient is kept in a situation favourable to this event; or else, some other evacuation occurs, or a second inflammation arises, under which the *pyrexia*, or febrile action, subsides.

The local change, also, attending the *spontaneous* subsidence of *idiopathic fever* are similar to those of ordinary inflammation, as far as a similarity of structure and of function will allow. The cerebral substance indeed has no counterpart in any of the other structures of the body, and therefore no exact resemblance is to be looked for; but as far as any analogy holds, there will be found a remarkable correspondence between the two affections.

Thus, other organs that have recently suffered inflammation are often left for a time in a tumid state, more vascular in structure, more irritable in disposition, and more sensible to

impression; changes that must necessarily disturb and derange, in greater or less degrees, their functions; and that for a longer or shorter period, according as those changes may be more or less durable. We cannot, of course, have demonstrative proof of the actual physical condition of the cerebral substance during life; yet the anatomical examination of this organ after death, proves incontestably, that the brain is not exempt from the ordinary effects of inflammation, in regard to structure; while the symptoms during life shew us, that a corresponding change of functions has taken place. The impaired or disordered state of one or more of the *senses*, on some occasions, after fever; of the *muscular power*, in others; and in many also, of the *intellect*; are sufficient proofs that the brain, in regard to its physical condition, is not in a natural state.

In respect to the *meninges* (which, though not necessarily, yet, probably, in most cases of fever, participate more or less in the inflammation) we may observe an exact correspondence in the result of inflammation, as affecting

those coverings, and inflammation of the *serous membranes* in general. One of the most ordinary modes in which inflammation terminates, when it affects *serous membranes*, is by effusion and accumulation of serum; and the same, judging from symptoms, there is reason to believe, is a general consequence of fever, when of any considerable duration. The dull, unmeaning stare, the dilated pupil, the fallen features, the extreme muscular debility (out of all proportion with what is observed after other diseases, of equal apparent violence), the great disorder produced in the functions of the brain, upon every sudden change of posture of the head, (the effect doubtless, of a different gravitation of the accumulated fluid;) all concur to make it probable that effusion has taken place.

Some have denied the power of medicine to cut short the course of fever, and think that physicians deceive themselves by ascribing effects to causes, that have in reality little or no influence on their production. Dr. William Brown, one of the surgeons to the Royal Infirmary of Edinburgh, in a paper published in Dr.

Duncan's *Annals of Medicine*, for 1802, entitled, "Observations on the Duration and Course of Fever in Britain, and on the Efficacy of Medicine, in interrupting its course, and shortening its duration," endeavours to shew, from the records of the Infirmary, that medicine has not the effect of putting a speedy termination to fever; and he even thinks it proved, by the same evidence, that the disease was not at all shortened by the medicines applied.

Out of 280 instances registered, which he particularly examined, only twelve were marked in which the fever ceased on the day that medicine was first applied, viz., one on the 5th, one on the 6th, four on the 7th, one on the 8th, one on the 10th, and three on the 13th day of the disease. In the three first days after admission, 71 cases of *remission* took place: which is only one in four. And of the whole number of cases (280), it appears that only 159 were cured within the period of six days after the application of medicine was begun.

These facts, however, go only to prove, that when the course of fever is once established in

the system, and the disease has proceeded for a certain number of days, it is exceedingly difficult to interrupt its progress by the ordinary means of cure. This has been at all times known to practitioners, and was, indeed, the principal cause, combined with the frequent spontaneous termination of the disease, of their adopting, in general, the *palliative* mode of treatment. The conclusion drawn by Dr. Brown by no means applies to the early stages of fever, in which, beyond all doubt, the disease, in a large proportion of instances, is capable of being interrupted in its progress, and brought to a speedy termination, by the active means above pointed out.

From what has been now stated, it is evident that there are two modes of treating *idiopathic fever*, as well as other inflammations; the one, *passive* or *expectant*, as it has been called, and which consists merely in putting the patient into the most favourable situation, guarding against accidents and all causes of aggravation, and endeavouring to palliate particular symptoms as they arise; the other, *active* or *curative*;

where the object is, to endeavour to cut short the disease at once, by the use of the most powerful means of cure, especially by *blood-letting*, largely and repeatedly administered.

The former mode of practice has generally been adopted by cautious and indolent practitioners, and has indeed much to recommend it. It calls for a less exercise of judgment and discrimination in practice ; while the result, under favourable circumstances of the disease, if not on all occasions so successful as to warrant its universal adoption, is yet sufficiently so to ensure a moderate share of reputation to the practitioner. There are, however, many circumstances of fever, in which so passive a mode of proceeding is not to be justified, since it might lead to the destruction of the patient. It becomes a matter, therefore, of no small importance to decide between them. But this can only be satisfactorily accomplished by careful and minute examination of the different varieties of fever in detail, a subject that will engage our attention hereafter.

At present it may be stated, in a general way,

that the absolutely *curative* mode of treatment, as consisting more especially in the use of copious *blood-letting*, is only proper at the outset of the disease, when it may be employed not only with safety, but with a great probability of success ; while, in the more advanced stages, it is an equivocal remedy, not likely to succeed in putting an immediate stop to the disease, and is, possibly, not without danger. It is proper, and even necessary, in the most *violent* forms of fever, such as occur very generally in hot climates, and occasionally in temperate ones, in young and vigorous subjects more especially. It is not adapted to the case of *specific* fevers, these having a determined course to run, which can seldom admit of being interrupted, or even much disturbed, without disadvantage.

On the other hand, the *passive*, or *palliative* mode of cure is applicable to the *milder* forms of fever, and where the disease has advanced far in its course, when the active or *curative* treatment is no longer applicable. It is likewise the only means that can be properly used

in the case of the *specific* fevers, for the reason stated above.

It is of importance to remark, that fever often sets out in the mildest and most insidious manner, so as to attract little notice for many days; after which, it gradually increases in severity, assuming even a *malignant* character, and at length proving fatal, although, in the beginning, no danger was apprehended. The impossibility of distinguishing such cases at their outset, makes it a matter of prudence to treat all with attention, and justifies the use of active treatment, even in the milder cases, in the beginning; for this is the most likely means of preventing such degeneracy. There is nothing, as I believe, more unfounded than the notion, that the use of *blood-letting*, and other debilitating means, tends to impart a character of *malignity* to fever, and to convert the *mild* into what is called the *typhoid* state. The very reverse appears to be the fact: and if there is any foundation for the pathology of the disease here brought forward, the matter is easily understood. The *symptoms of malignity*, as they are

termed, are the effect of the injury and *oppression* which the brain has suffered, by the violent action of its own vessels, and which *blood-letting* tends to *prevent*, even more than to *cure*.

SECT. XXXVII.

OF THE USE OF FOOD IN FEVER.

A FEW words will suffice on this subject. It would have been unnecessary, indeed, to have made any observation with regard to it, had practitioners condescended to take Nature for their guide, instead of acting in direct opposition to her dictates.

The *loathing of food* that so commonly takes place at the very commencement of fever, and which generally continues throughout its course;—the immediate stop put to digestion, as manifest in the state of the matters discharged from the stomach, often after having been taken for several days;—and the *vomiting* and *diarrhœa* that are so frequently excited by taking food during fever, might serve to convince us of the impropriety of giving much food under such circumstances. Yet the fear of *debility*, upon the idea that this constituted the

essential part of the disease, has sometimes led practitioners to prescribe the use of *stimulating* and nutritious articles of diet, as if the giving food was tantamount to giving strength to the body.

A recent writer, otherwise of good observation, says, "it is necessary in *typhus* to use every means in our power to increase the quantity of blood." This, to me, appears quite hypothetical. The suggestion, indeed, is limited by the observation, "that the quantity taken at one time should be small, and only repeated as often as the patient can take it *without oppression*." If this rule is properly attended to, little harm, certainly, will be done; but, at the same time, very little food will be taken.

The observation of those we are most accustomed to rely on, has sufficiently evinced that there is very little room for the exhibition of food in fevers; and that, in general, our best guide will be the inclinations of the patient: while no cause is so conducive to relapse in convalescents, as the too early permission to indulge in a stimulant and nutritious diet.

RECAPITULATION.

THE object of the foregoing pages is to establish the following propositions :—

First, that *proper* or *idiopathic* fever is not *primarily* a disease of the whole system, as has commonly been supposed, but a topical affection of the brain.

Secondly, that the affection consists in *inflammation of the cerebral substance*, denoted by pain in the part affected, throbbing of arteries in the head and neck, increase of heat, disordered sensorial functions, and all the other local signs of inflammation; while the *general disorder* that takes place in the system (the febrile state, or *pyrexia*) is merely *symptomatic* of the *local affection*, the same as in other inflammations.

In support of the former proposition it has been argued, that in a great proportion of in-

stances (that is, where the disease makes its approaches in a mild and gradual way, so as to allow time for correct observation), the *local* symptoms are found to precede the *general* or *constitutional* ones. On some occasions, however, the general disorder (the *pyrexia*) follows so closely on the heels of the *local* affection, as to appear to be simultaneous with it; and as the general or *constitutional* disorder is often the most prominent and striking, it has been supposed to constitute the disease itself, though only a consequence of it, as in other inflammations.

The truth of the *second* proposition, namely that the affection consists essentially in inflammation of the brain, is inferred from the general character of the disease, and its strict analogy with other inflammations.

The distensile, and often throbbing pain, so commonly felt in the head: the increased heat of this part, perceptible even when the rest of the body is shivering with cold; the strong pulsation of the carotid and temporal arteries; the suffused appearance of the eyes; the excited as well as *disordered* state of the *cerebral* func-

tions in the early *stages* of the disease, and the *oppressed* condition of those functions *afterwards*; are all sufficiently indicative of the existence of inflammation in the brain: while this opinion receives all the support from dissection after death, that could reasonably have been expected.

The state of the general system, also, is the same in *idiopathic* fever, as in ordinary inflammation. In both, in addition to the signs of *topical* affection, there is *pyrexia*, or a febrile state of system, characterized by foulness of the tongue, frequency of the pulse, and increase of heat; with other marks of excited and disordered general circulation.

The manner of attack, the general progress of the disease, and its decline, are similar in both; while the *predisposing* and the *exciting* causes are of the same general nature. The remedies that are unequivocally useful, are likewise the same in both.

The *topical* nature of fever is further shewn by the sequelæ or consequences of the disease. After the general or constitutional disorder

(the *pyrexia*) has subsided, the marks of disordered brain still continue, and only gradually and slowly disappear. From a state of long watchfulness, (or of stupor, on some occasions) the patient falls into a deep but natural sleep, which continues, often, with short intervals, for many days. The sleep is, long after, apt to be disturbed with frightful dreams. Deafness often remains for a time, and sometimes permanently; or one of the other senses is more or less impaired. The *muscular* power is reduced, in a greater degree than is observed after other diseases; and the *mind* is proportionally weakened—to say nothing of the *epilepsies*, *palsies*, general or partial, the *loss of memory*, *aberrations of mind*, or absolute *fatuity*, with the other *nervous affections* (as they are called), that so frequently follow *idiopathic* fever, and point to the organ principally affected. The headache is easily renewed long afterwards, by the most trivial causes; such as drinking a glass of wine, or any bodily or mental exertion. The hair generally falls off, the result, probably, of the increased arterial action

that has taken place in the whole head, during the course of the disease.

It appears then, according to what has been stated above, that every case of idiopathic fever comprizes *two* stages, though they are not always readily distinguishable in practice. The *first*, or *incipient stage*, when the symptoms are altogether local, and consist in uneasy feelings in the head, and disordered cerebral or sensorial functions; the second, or *confirmed stage*, when the whole system has become disturbed, from sympathy with the *local* affection. It is in the latter stage only, that the term *fever* can with strict propriety be made use of.

Now if, during the *first stage*, it is attacked vigorously; as by *blood-letting*, or by a powerful *emetic*, or *purgative*; or if the patient is thrown into a *profuse sweat*; the progress of the disease is often checked at once, and it proceeds no further.

It not unfrequently, also, in this stage, subsides spontaneously, without the aid of medicine. And as, in these cases, the disease is never fully formed, nor goes through the usual course,

it is not called *fever*, but perhaps a *sick headache*, or a *feverish cold*. Sometimes, the stomach is *sympathetically* disordered by the previous affection of the brain; vomiting takes place, and *bile* is ejected, which is supposed to be the *cause* of the disorder, instead of the *effect*: the case is then termed *bilious*, and calomel is administered, in order to *correct the bile*; generally, it must be allowed, with advantage, from its acting as a purgative, on the principle, probably, of counter-irritation.

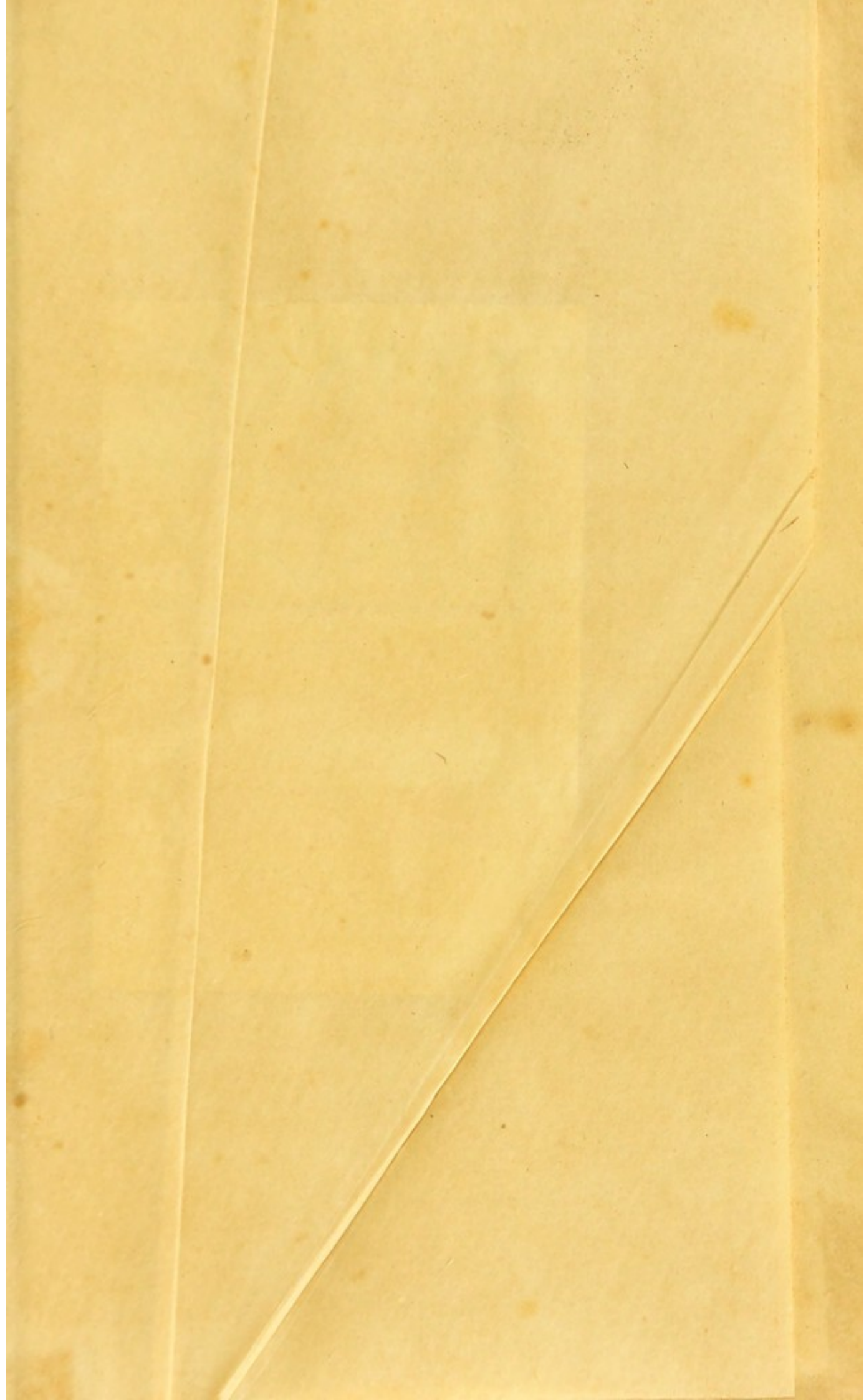
In the *second* stage, when the disease is fully formed, it is with difficulty superseded by art, the tendency to pursue its course being stronger the further it has proceeded; till the period of termination approaches, when the disposition appears again to decline, and remedies, such as *sudorifics*, and *opium*, and *blisters*, are employed with good effect, which, at an earlier stage, would have been useless, and perhaps injurious.

I feel it necessary in this place to protest against an inference that has been hastily drawn by some, from the doctrine here advanced, and which is calculated to bring it into disrepute;

this is, that supposing fever to consist essentially in inflammation of the brain, it should require (like *phrenitis*) the aid of copious *blood-letting*, as the principal means of cure. Such an inference, however, is no just or necessary deduction from the theory in question. *Blood-letting* is not an absolute or direct remedy for inflammation, in any case. It only gives a disposition to the disease to go off; and that not at all times, nor under all circumstances. On many occasions of inflammation, *blood-letting* is not only useless, but positively injurious: and such undoubtedly, is often the case in regard to fever. It behoves us, therefore, to be well acquainted with the various circumstances that regulate and determine the use of so powerful an agent; and this is no easy task. *Blood-letting* unquestionably, is the best, because the most effective remedy we possess, in the treatment of *idiopathic* fever, as well as in inflammation in general. But, in both it requires to be administered with equal caution and discrimination.

FINIS.





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